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PACIFIC ISLANDS.

VOL III.

(EASTERN GROUPS.)

1885.

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ADVERTISEMENT.

This work contains Sailing Directions for the Tubuai, Cook, and Society islands, Paumotu or Low Archipelago, Marquesas and scattered islands near the equator, and the Sandwich islands.

These directions have been compiled from various sources, the voyages of the early navigators supplying much useful information, which has been supplemented by the later and more detailed surveys by the French and Hawaiian Governments, together with the remarks and journals of officers of Her Majesty's Ships employed on the Australian and Pacific stations.

The Tubuai and Cook islands have been described by Captain Cook, 1769–77, Admiral Krusenstern, Russian Navy, 1803, and the officers employed on the French surveys of recent date. The Society islands by Captains Wallis, 1767, Cook, 1769–77, F. W. Beechey, 1826, FitzRoy, 1835, and the detailed surveys by the officers of the French Navy from 1844 to 1884. The Paumotu archipelago by Captains Cook, 1769–74, F. W. Beechey, 1825–26, and Captain Wilkes, U.S.N., 1841, together with the reports by officers of the French Navy surveying among the group. The Marquesas islands by Captain Cook, 1774, Admiral Krusenstern, 1803, and the officers of the French Government surveys. The Sandwich islands by Captains Cook, 1778, Vancouver, 1793, and Sir Edward Belcher, 1838, Captain Wilkes, U.S.N., 1841, Rev. Wm. Ellis, in his work "Polynesian Researches," 1853, and the surveys by officers under the Hawaiian Government. Much additional detailed information relative to the various localities has been received from time to time from the officers, both of the Royal and Mercantile Navies of various nationalities, navigating these seas.

The portions of Hydrographic Notices of the Pacific Ocean, Nos. 1 to 68, relative to this work have also been incorporated.

The directions have been compiled by Lieutenants G. E. Richards, and G. C. Frederick, R.N., of the Hydrographic Department.

W. J. L. W.

Hydrographic Office, Admiralty, London,
November 1885.

ORTHOGRAPHY.

As far as has been found possible, the native names in this book are spelt in accordance with the following system, which will gradually be introduced into all Admiralty Sailing Directions.

Where native names have been so long written in a form, which, though not in accordance with this system, has become familiar to English eyes from being so spelt in all charts and maps, they are retained, and no European names are changed from their correct orthography.

Information as to the proper spelling of native names so as to produce the nearest approximation to the true sound, by this system, is invited, but it must be remembered that only an approximation is aimed at. The position of the accent denoting the syllable on which emphasis, or the "stress," should be laid is very important, as the sound of so many words is utterly changed by its ignorant misplacement.

Letters.	Pronunciation and Remarks.	Examples.
a	*ah, a* as in *father* - - - -	Java. Wana Wana. Banana.
e	*eh, e* as in *benefit* - - - -	Tel-el-Kebír. Levu. Medina.
i	English *e; i* as in *ravine*; the sound of *ee* in *beet*, Thus, not *Feejee*, but	Fiji. Tahiti. Hindi.
o	*o* as in *mote* - - - - -	Tokio. Mallicolo.
u	long *u* as in *flute*; the sound of *oo* in *boot*, Thus, not *Zooloo*, but	Zulu. Upólu. Sumatra.
	All vowels are shortened in sound by doubling the following consonant.	Yarra. Tanna. Mecca. Lakenna. Jidda. Mille. Bonny. Korror. Budda.
	Doubling of a vowel is only necessary where there is a distinct repetition of the single sound.	Kaaba. Haano. Oosima. Nuulua.
ai	English *i* as in *ice* - - - -	Shanghai. Mai.
au	*ow* as in *how* - - thus, not *Foochow*, but	Fuchau. Marau.
ao	is slightly different from above - - -	Macao. Palao.
ei	as *ey* in English *they* - - - -	Beirút. Nei-afo.
b	English *b*.	
c	is always soft, but is so nearly the sound of *s* that it should be seldom used. If *Celebes* was not already recognised it would be written *Selebes*.	Celebes.
ch	is always soft as in *church* - - -	Chingchin. Komachu.

Letters.	Pronunciation and Remarks.	Examples.
d	English *d*.	
f	English *f*. It should always be put for *ph*. Thus, not *Haiphong*, but	Haifong. Rofei.
g	is always hard. (Soft *g* is given by *j*) - -	Galápagos. Gogan.
h	is always pronounced when used.	
j	English *j* - - - - - -	Japan. Euaji. Jínchuen.
k	English *k*. It should always be put for the hard *c*. Thus, not *Corea*, but	Korea. Kulambangra.
kh	The Arabic guttural - - - -	Khan.
gh	is another guttural, as in the Turkish - -	Dagh. Ghazi.
l m n p	As in English.	
q	should never be employed; *qu* is given as *kw* -	Kwangtung. Kwakwaru.
r s t v w x	As in English. - - - - - - - -	Sawákin. Maiwo.
y	is always a consonant, as in *yard*, and therefore should never be used as a terminal, *i* or *e* being substituted. Thus, not *Mikindány*, but nor *Kwaly* but	Kikuyu. Yemyu. Mikindáni. Singavi. Kwale. Paluale.
z	English *z* - - - - -	Zulu.
	Accents should not generally be used, but where there is a very decided emphatic syllable, which alters the sound of the word, it should be marked by an *acute* accent.	Tongatábu. Galápagos. Paláwan.

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IN THIS WORK THE BEARINGS ARE ALL MAGNETIC,
EXCEPT WHERE MARKED AS TRUE.

THE DISTANCES ARE EXPRESSED IN SEA MILES OF
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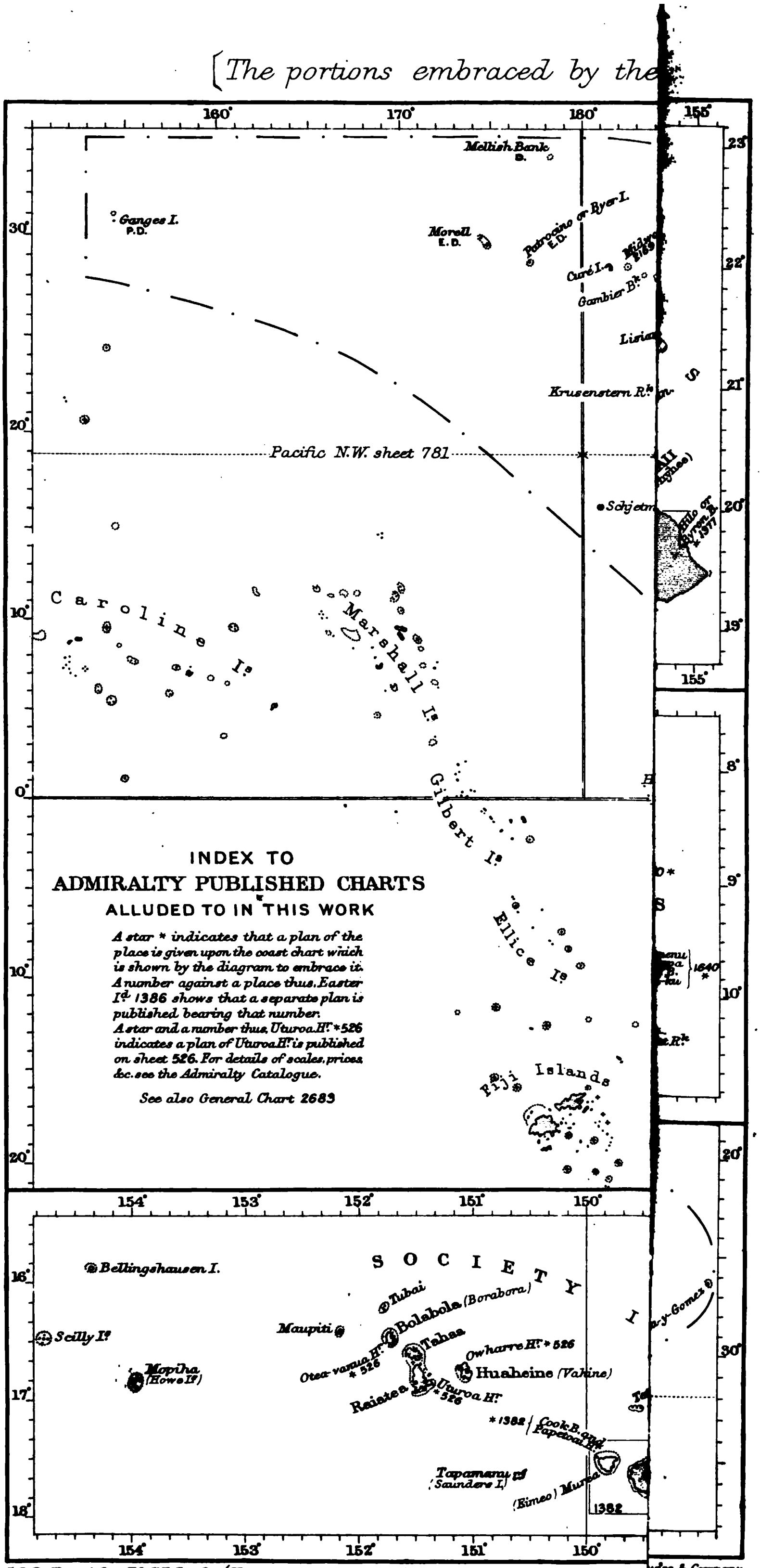

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ALLUDED TO IN THIS WORK

*A star * indicates that a plan of the place is given upon the coast chart which is shown by the diagram to embrace it.*
A number against a place thus, Easter Id. 1386 shows that a separate plan is published bearing that number.
*A star and a number thus, Uturoa Hr. * 526 indicates a plan of Uturoa Hr. is published on sheet 526. For details of scales, prices, &c. see the Admiralty Catalogue.*

See also General Chart 2683

13^D Pacific I^s Vol. 3. (Eastern Groups)

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PACIFIC ISLANDS, VOL. III.

(EASTERN GROUPS.)

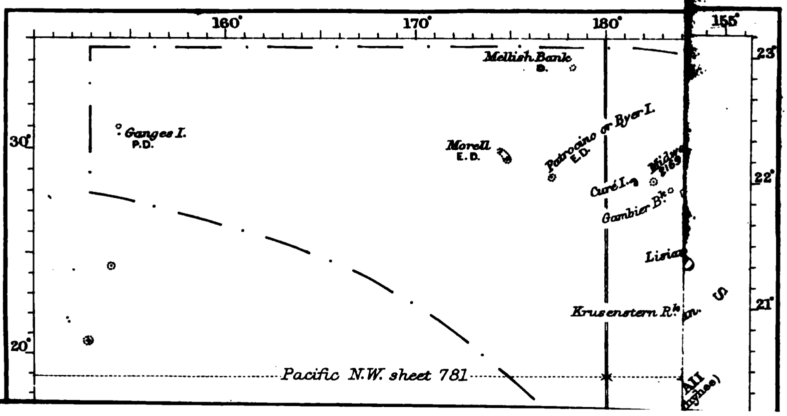
For later information respecting the lights which are described in this work, seamen should consult the Admiralty List of Lights in South America, Western Coast of North America, Pacific islands, &c. These Light Lists are published early in the current year, corrected to the preceding 31st December.

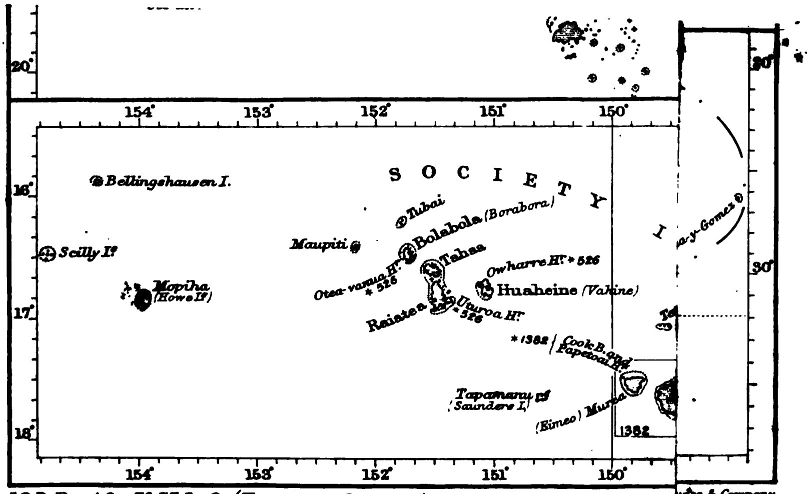
W.; and in north latitude, the islands near the equator in the vicinity of long. 160° W., together with the Sandwich group, and the chain of islands and reefs extending to the north-west of that group as far as long. 170° E.

The Paumotu or Low archipelago in the south-eastern part, is a mass of low coral islands to which there are only three exceptions (Henderson, Pitcairn, and the Gambier islands). Navigation among these groups is dangerous on account of the uncertain set of the currents, and the still imperfectly charted reefs and islands. However, there is but little to be obtained in the way of trade from the natives, who are content to earn a scanty living on the cocoa-nuts which grow on the islands, and the fish which they catch in the lagoons, so that there is little inducement for vessels to visit these groups.

The Society islands, however, which lie but a short distance to the west-

[*The portions embraced by the*





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PACIFIC ISLANDS, VOL. III.

(EASTERN GROUPS.)

CHAPTER I.

GENERAL REMARKS.—WINDS.—CURRENTS.— OUTLYING REEFS AND REPORTED DANGERS.—RAPA ISLAND.—TUBUAI OR AUSTRAL ISLANDS.—COOK ISLANDS.

VARIATION IN 1885.

	° ′
Rapa island - - -	9 30 E.
Tubuai islands - - -	9 0 E.
Cook islands - - -	9 0 E.

GENERAL REMARKS.—The portion of the Pacific ocean embraced in this work, includes all the islands and reefs south of the equator, between the meridians of 100° W. and 160° W.; and in north latitude, the islands near the equator in the vicinity of long. 160° W., together with the Sandwich group, and the chain of islands and reefs extending to the north-west of that group as far as long. 170° E.

The Paumotu or Low archipelago in the south-eastern part, is a mass of low coral islands to which there are only three exceptions (Henderson, Pitcairn, and the Gambier islands). Navigation among these groups is dangerous on account of the uncertain set of the currents, and the still imperfectly charted reefs and islands. However, there is but little to be obtained in the way of trade from the natives, who are content to earn a scanty living on the cocoa-nuts which grow on the islands, and the fish which they catch in the lagoons, so that there is little inducement for vessels to visit these groups.

The Society islands, however, which lie but a short distance to the westward, present a very different appearance. They are high, mountainous islands covered with luxurious vegetation to the summits, and well cultivated in the plains and valleys, with numerous streams and cascades running down their sides into the sea.

This group is in the possession of the French, who have their chief establishment at Papiete in the island of Tahiti, a good harbour where supplies of all descriptions can be obtained and small repairs to machinery effected.

The Marquesas islands which lie to the northward of the Paumotu archipelago are also in the possession of the French. They are high well-wooded islands with several good anchorages and harbours, the best of which is Anna Maria or Taï-o-haé bay in Nukuhiva or Marchand island where the French establishment is situated.

These islands are but little cultivated, although the soil is good and well adapted to the growth of cotton, &c. Supplies may be obtained at the principal ports, sufficient for the wants of vessels calling, and the natives are willing to trade.

The scattered islands near the equator in the vicinity of the 160th meridian, are all low coral islands covered with a scanty vegetation and a few cocoa-nut trees. From a few of these islands, large quantities of guano have been exported, but the supply is now nearly exhausted; otherwise they are of but little value, only producing a small number of cocoa-nuts, &c.

The Sandwich islands, the most important group in the Pacific ocean, consist of eight high volcanic islands, the southern of which is still in a state of activity.

These islands afford several good anchorages, but the most important port is Honolulu in Oahu, which is the seat of the Hawaian Government, the port of call for steamers running between America and China or Australia and the commercial centre of the group. There is a snug inner harbour here, formed by an opening in the reef, capable of admitting vessels drawing not more than 20 feet of water. Supplies of all kinds are abundant, and the islands are well cultivated in sugarcane, &c. which yields large quantities and produces a good trade.

WINDS.—The winds that generally blow in the region which is included in this volume, are the N.E. and S.E. trades; but some remarks as to their regularity and direction among the different groups is necessary, as they are by no means as constant as their counterparts in the Atlantic.

Generally speaking, the S.E. trade may be described as included in a belt some 28 degrees broad, which alternates to northward and southward according to the season, reaching as far as 8° N. in July and August, but only to about 3° N. in January. However, this trade does not blow across the whole breadth of the south Pacific with that steadiness which might have been expected, and the small low islands of the Paumotu archipelago appear to cause a great irregularity both in its force and direction.

At Easter island, far away to the eastward, the S.E. trade blows steadily from October to April, but in the winter months (April to October) when the trade has receded to the northward, westerly winds prevail and there is much rain.

In the vicinity of Pitcairn island, at the south-east end of the Paumotu archipelago, there is no regular trade, but in summer the wind is generally between E.S.E. and North, and in winter between E.S.E. and S.W.

At Rapa island, which is just outside the limits of the S.E. trade, the wind is generally from the eastward from October to April, with occasional westerly breezes, especially from December to February. From May to September the prevailing wind is from the westward, with heavy gusts, and there is much rain.

As before mentioned, the trade wind among the Paumotu archipelago is very unsteady both in strength and direction, especially from November to March when heavy squalls from the westward and north-westward are often experienced.

Among the Society islands the S.E. trade blows steadily from April to December, but during the remainder of the year westerly winds are frequently experienced.

Even in the vicinity of the Marquesas group, which is situated in the latitude of the heart of the trade, the S.E. wind is by no means as constant as in the Atlantic ocean, though the wind is nearly always to the eastward, only occasionally getting to the westward of North, when it may be expected to turn to a gale. From April to October the wind is generally S.E., whereas from October to April it is usually from E.N.E.

Near the equator in the vicinity of Christmas and Fanning islands, the trade becomes an easterly wind which blows steadily during the greater part of the year. At Fanning island, from January to March, the wind becomes uncertain as the S.E. trade recedes to the southward, and sometimes strong northerly winds are experienced with much rain.

The N.E. trade in the north Pacific is a belt of wind some 20 degrees in breadth, which blows with tolerable regularity across the whole of the ocean. It alternates to northward and southward with the S.E. trade, but there is not such a broad belt of calms between them as in the Atlantic ocean.

The Sandwich islands in about 20° N. experience this trade during the greater part of the year, sometimes with the force of a gale; but in the winter months it is not unfrequently interrupted by southerly and south-westerly gales which sometimes blow for several days in succession.

HURRICANES.—Little is known of the details of rotatory storms occurring among the islands of the southern Pacific, but that they have been experienced from time to time, there is no doubt, and it remains for those navigating these regions to send in detailed accounts of such as are met with, for the benefit of their brother seamen.*

These hurricanes, as far as is yet known, generally occur between December and March, but they may possibly occur at other times of the year, as two hurricanes (or at least storms much resembling them) are reported to have passed over the western groups of the Paumotu archipelago in September 1877 and February 1878, but we have no satisfactory accounts of their true character.

Among the Cook islands it is reported that they occur about once in seven years, between the months of December and March; there can be no doubt as to their revolving character as they usually commence at N.W. to North and end at S.E.

A hurricane has been reported to have passed over Caroline island in 1878, but there is no mention as to the month; and Penrhyn island is supposed to be subject to these storms, as many of the cocoa-nut trees are without heads.

CURRENTS.—The general tendency of the great mass of water in the tropical regions of the Pacific is to the westward, and forms what is usually known as the equatorial current; but between the two sets in north and south latitude, there is a narrow belt running to the eastward, called the Equatorial Counter current which is somewhat analogous to the belt of calms and variables between the N.E. and S.E. trade winds.

However, it must not be supposed that this westerly tendency is invariable, for it will be found at times to run in an exactly opposite direction from no apparent cause, and to be diverted from its course by the islands and reefs which bar its progress, or by the winds, which have a great effect on the surface water.

In the south Pacific this westerly current will generally be met with from about the parallel of 25° S. as far as the equator or even 4° N.; but the limits are liable to change and probably move north and south with the trade winds.

Near Pitcairn island the current generally runs to the westward with a velocity of about 12 miles a day; but among the Paumotu archipelago the currents are very irregular. During settled weather and a steady trade the set is usually to the westward from 5 to 25 miles a day; but when the wind is westerly, which is frequent between October and March, the current is reversed and runs to the eastward from one to 2 knots an hour. The uncertainty on these occasions, as to the direction in which the current may be running, renders navigation among this mass of islands very dangerous.

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* For further information on this subject, *see* Admiralty pamphlet, "Remarks on revolving storms."

Among the Cook and Society islands, the westerly set is fairly regular, and runs at a rate of from 12 to 20 miles a day; but strong winds from the opposite direction are liable to influence the rate, and at times, reverse the current.

On nearing the equator, the current will be found to increase in strength, and amongst the Marquesas has a velocity of from a half to 2½ knots per hour; but even here when strong westerly winds have been blowing, the surface water has been observed to run to the eastward in the channels between the islands.

Near Starbuck and Malden islands, in lat. 5° S., this current attains a velocity of from 32 to 56 miles a day to the westward, and much care is requisite in approaching these islands, to keep well to the eastward, as with a light trade there is great difficulty in beating back against the current.

Near Christmas island in lat. 2° N. the current is generally strong to W. and N.W. as much as 37 miles a day; but good observations tend to show that the counter current is sometimes experienced as far south as the equator, and caution is therefore necessary in obtaining good astronomical observations for the position of the ship.

The equatorial counter current may usually be expected between the parallels of 4° and 9° N., where there is a strong set to the eastward of from 12 to 50 miles a day. The line between the easterly and westerly currents is very distinctly marked at times, but the limits of the east-going stream have been found to extend as far south as the equator.

In 1875, H.M.S. *Challenger*, when on the passage from Honolulu to Tahiti, experienced very strong currents.

The northern equatorial current extended to 11° N.; its general direction being S. 60° W., 18 miles per day, and its temperature varying from 77° to 79°. From 11° N. to 6° N. the equatorial counter current was found running to the eastward at an average rate of 30 miles per day, but its force in 7° N. was 50 miles a day, and its temperature varied from 80° to 82°.

From 5° N. to 5° S. the southerly equatorial current was running to the westward at an average rate of 43 miles a day, but in 1° N. its velocity was no less than 70 miles per day. Its temperature varied from 79° to 77°, being 77° at its axis of greatest rapidity. This extraordinary rate was also experienced by the French corvette *L'Eurydice* in the month of August 1857, in 3° 50′ N. The *Challenger* also found this current setting to the westward, just north of the Admiralty islands in March 1875, with an average rate of 30 miles per day, but its temperature then was from 83° to 84°. From 5° S. to Tahiti the currents were to the southward about 12 miles per day.

In the north Pacific the equatorial current is much narrower than in the southern Pacific, and will not usually be met with to the northward of 20° N. Between the equatorial counter current and the Sandwich islands, the set is from 12 to 40 miles a day to the westward.

Among the Sandwich islands the current is generally running to the westward at a rate of from one to 1½ knots per hour, but it varies a good deal, and runs in the opposite direction at times without any apparent cause.

A more detailed description of the several groups of islands, is given under their respective headings.

OUTLYING REEFS AND REPORTED DANGERS.*

MARIA THERESA REEF, which was reported in 1843 by Captain Tabor of the *Maria Theresa* to be in lat. 37° 0′ S., long. 151° 0′ W., is placed by recent investigation in lat. 37° 0′ S., long. 151° 13′ W.

REPORTED BREAKERS.—Mr. Ringe, commanding the German barque *Jupiter* on the voyage between Newcastle (New South Wales) and Tahiti, reported having passed breakers during the night of December 3rd, 1878, in latitude 36° 37′ S., long. 150° 15′ W. The breakers were observed in two places, each of which had a diameter of about 30 yards, and appeared to be one quarter of a mile apart.†

L'ORNE BANK.—On September 11th, 1874, the French transport *l'Orne* passed over a bank upon which a depth of 16 fathoms, rock and sand, was found; 3 miles east of this spot there were 52 fathoms, rock, and at a distance of 5 or 6 miles east, no bottom was obtained at 98 fathoms. The approximate position of the depth of 16 fathoms, deduced from good observations, is in lat. 27° 42′ S., long. 157° 44′ W.

Captain M. Chambeyron, commanding the French vessel of war *le Curieux*, 1877, however, reported a depth of 5 fathoms as the least water on l'Orne bank.‡

HAYMET ROCKS were reported by the cutter *Will Watch*, J. E. Haymet master and owner, when on her passage between Auckland

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* *See* Admiralty charts:—Pacific Ocean, General, No. 2683. Pacific Ocean, S.E. sheet, No. 783. South Pacific Ocean, Western Sheet, No. 788.

† From Nachrichten für Seefahrer, Berlin, No. 1 of 1880; also, No. 41 of 1879.

‡ Paris Annonce Hydrographique, No. 9 of 1877.

and Rarotonga; the cutter struck on the northern of two rocks, damaging her false keel.*

The rocks are said to extend over a space of about a quarter of a mile, to have been distinctly seen, and with apparently 7 or 8 feet water on them. Mr. Haymet gives their position as in lat. 27° 11′ S., long. 160° 13′ W.

In December 1882 Lloyd's agent at Rarotonga reported that the Haymet rocks were supposed to exist about 150 miles S.S.W. of Rarotonga; and are therefore right in the track of vessels bound from Auckland to that island, who always give this supposed position a wide berth.

NEILSON REEF.—On January 19th, 1827, the ship *Sir George Osborne* passed between two portions of this reef, on which the sea broke in places, being nearly level with the water. White coral was seen under the ship in from 4 to 6 fathoms, and the reef extended a considerable distance, curving to the south-eastward in the form of a crescent as far as could be seen from the masthead. In 1831 the ship *Lancaster* struck on this reef, the least depth found being 12 feet.

The position given by the *Sir George Osborne* is lat. 27° 0′ S., long. 146° 17′ W.

BASS ISLANDS.—This group, consisting of four small islands, lying about 43 miles E. by S. of Rapa island, has recently been passed by the French vessels of war *Lamothe-Piquet*, and *D'Entrecasteaux*. The south-east rock, 346 feet above the sea, and the highest of the group, is considered to be in lat. 27° 55′ 30″ S., long. 143° 28′ W.

RAPA ISLAND.†

This island, which was formally placed under the French protectorate in March 1881, was discovered by Vancouver in 1791. It is of very irregular form, about 18 miles in circuit, with several deep indentations in the coast; the largest of these, named Ahurei bay, is situated on the east side of the island.

The coasts of Rapa island are bold, with no off-lying dangers beyond half a mile.

The appearance of the island is remarkable, its high craggy mountains forming in several places most remarkable pinnacles, with nearly perpendicular cliffs from their summits to the sea. The highest point of the island, mount Perahu, is 2,172 feet above the sea, and may be seen from a distance of 55 miles.

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* From information received by Commander Mayne, H.M.S. *Eclipse*, 1863.

† *See* Admiralty plan of Rapa island on sheet, No. 29.

The mountains are generally bare or covered with stunted trees on the eastern side of the island; the west side on the contrary is covered with a rich vegetation, and most noticeably some forests of large tree ferns.

All the summits of the mountains which are not absolutely inaccessible, and all the principal passes which give access from one valley to another are commanded by well constructed forts of hard stones, and generally built in terraces commanded by a tower.

These constructions are very ancient; the natives say that the island formerly contained a numerous population, divided into tribes usually at war with one another; this explains the existence of the forts, built to protect each valley against the incursions of neighbouring tribes.

The inhabitants are in appearance a fine well made race, somewhat resembling the natives of New Zealand, and in 1880 numbered about 150.

From the report of the French officers who visited the island in 1867, it appears to be a sterile spot, with but few resources; the climate does not admit of the growth of tropical fruits, and the inhabitants can scarcely gain subsistence from the soil.

A French war-vessel visits Rapa and other islands every 3 months, taking stores and provisions from Tahiti for the officials.

Ahurei harbour is a snug anchorage, open to the eastward, about half a mile wide and 2½ miles deep, the land rising on three sides like the wall of an amphitheatre, with protection on the east side by reefs and islets; having fresh air from the sea is also an advantage. On the south side is a large village, the residence of the king.*

The landing place at the village of Ahurei is formed by a stone pier, alongside which there is only one foot of water at low tide.

The bottom of the bay, to the north-west of Kutupui point is blocked with coral reefs. A conical island of some height, named Tapui lies at the head about one cable from the beach.

In 1868, the Panama Company had two coal hulks moored here, and this island will be used by their steamers as a stopping place and coal depôt on the route from Panama to New Zealand. The return voyage lies further to the southward, in order to benefit by the westerly breezes.†

Between Kutupui and Nukutere points on the north shore, lies the village of Area at the foot of some small cliffs, where the English company have established their storehouses.

The exit to the harbour is inconvenient for sailing vessels on account of the prevalence of easterly winds.

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* *See* plan of Ahurei harbour on Admiralty chart No. 29.

† Nautical Magazine, vol. xxxviii. of 1869.

The water is deep, the bottom coral, covered with a thin layer of mud. The squalls from the mountains and high land are sometimes very violent; there is, however, but little danger of dragging, the anchorage being well protected by reefs at the entrance.

At 4 cables E. by S. of Nukutere point lies Tauna island, a small sand island nearly awash and without any vegetation, in lat. 27° 36′ S., long. 144° 17′ W.

Buoy and beacons.—The entrance channel through the reefs is marked by beacons and a buoy. Two white triangular beacons on Tekaungarahu point, in line on a N.W. by W. bearing lead in between the reefs, and an iron tripod with a ball on the summit (situated on the reef opposite mount Tanga) in line with the extremity of Kutupui point, indicates the turning point into the harbour. A red buoy marks the extremity of the shore reef eastward of Maomao point.

Directions.—On approaching Ahurei bay, steer for Rapa Iti until the two beacons on Tekaungarahu point are in line on a N.W. by W. bearing, when a course must be steered for them until past the red buoy marking the reef off Maomao point, when the beacon on the reef opposite mount Tanga in line with Kutupui point marks the turning point. The red buoy must be left on the port hand and the vessel kept in mid-channel until past the beacon, when steer for anchorage as convenient.

It is always advisable to employ a pilot.*

Pilots.—Two native pilots board vessels a little outside Rapa Iti island. It is advisable to accept their services, the channels being narrow, the currents irregular, and squalls frequent.†

On Saturdays, all the boats of Ahurei go fishing round the island; so that on that day vessels may expect to be detained some time for the pilot, should the boats be in the southern or western bays of the island. Firing guns at long intervals will bring them on board.*

Outer Anchorages.—Nearly all the bays which surround the island afford an anchorage and temporary shelter for small craft. These bays are filled with shoals, and vessels should not enter them without the assistance of the natives. These bays are Anatauri, Anataari, Hiri, Anarua, Piriati, Tubuai, Akamanue, Angairao, and Atanui.

Supplies.—No bread fruit or cocoa nuts can be obtained. Taro and pigs appear to be the only food of the natives.

Taro, bananas, cabbages, water melons, and maize grow well; potatoes as yet but indifferently. Coal of very inferior quality has been found in the interior; the natives sometimes use it for cooking, but it is useless for steam purposes.

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* Paris Notice Hydrographique, No. 19 of 1884.

† Lieutenant D. A. Wright, H.M.S. *Kingfisher*, 1883.

The watering place is on the north side of the anchorage, at the foot of a small cascade a little to the eastward of Kutupui point.

Tides.—It is high water full and change at 12 h. 15 m. Rise of tide 2 feet 6 inches.

Winds and Weather.—The prevailing winds during eight months of the year, from October to April inclusive, are from the eastward, but about once in three weeks during December, January, and February, westerly winds occur for a short period.

From May to the middle of September westerly winds prevail, blowing in heavy gusts, with rain, down the valleys of Ahurei bay, owing to the harbour being open to the eastward and landlocked in other directions.

From native report hurricanes are sometimes experienced on this island, destructive to houses, and rooting up the cocoanut trees. There are no cocoanut trees at present on the island.

A peculiarity of this island is the absence of surf and swell; a boat can land without risk at any part where not too precipitous.

TUBUAI OR AUSTRAL ISLANDS.*

This is a scattered group, consisting of five islands surrounded by fringing coral reefs which are generally steep to; lying between the parallels of 21° 40′ S. and 24° 0′ S., and the meridians of 147° 40′ W. and 154° 45′ W.

The islands of Vavitao and Tubuai are under French protection, the remainder are independent.

WINDS.—These islands lie near the limit of the S.E. trades; E.S.E. winds are the most frequent and steady during the year. North and N.W. winds generally occur in spring, and are followed by winds from the southwest which are often sudden and violent, veering to south and S.E.

With light N.W. winds, if clouds are observed rising from the southward, a sudden shift of wind to the southward may be expected, which comes up sometimes in furious squalls. These squalls are especially dangerous to vessels which are leaving Tahiti with the wind right astern from N.W., to gain the region of variable winds.

Cyclones are felt among the Tubuai islands, where they blow with great violence, and follow the usual law in the southern hemisphere; they are experienced during the summer months, especially in March.

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* *See* Admiralty charts:—Pacific Ocean, General, No. 2683. Pacific Ocean, S.E. sheet, No. 783. Paumotu or Low archipelago, No. 767.

CLIMATE.—The climate is mild and temperate. The seasons are well marked, and with southerly winds the temperature is fresh in the winter. The heat in summer is never excessive.

PRODUCTS.—The principal production of these islands is taro, the root of an aquatic plant which is a substitute for the indigenous bread-fruit tree of the Society islands. The taro-root kneaded and slightly fermented is exported to the Paumotu archipelago under the name of tivo or popoï. The manioc, arrow-root, cotton, tobacco, and sugar-cane grow well; bananas, oranges, and yams may also be obtained. Many pigs, fowls, and turkeys are reared here, and also some goats which live in a wild state.

VAVITAO or RAVAÏVAÏ ISLAND, in lat. 23° 55′ S. and long. 147° 48′ W., was discovered by Captain Broughton in 1791. It is about 10 miles long in an E.N.E. and W.S.W. direction, with conspicuous, high, rugged summits.

Reef.—The island is surrounded by a reef which extends from the land to a distance of nearly a mile, with numerous wooded islets on the southern and eastern parts of the reef; the eastern side of the reef extends seaward in a gradual slope; off the south-east part, at 2½ miles from the land, are from 11 to 16 fathoms, and near the top of the reef from 8 to 9 fathoms. On the western side of the island the reef is much steeper, and on the western part of it is an islet, which will be seen standing out from the mainland, on approaching from the north. About 2 miles eastward of this latter islet was found the only ship passage through the reef to the anchorage. This passage is about a mile long, with depths of 5 to 6½ fathoms, but it is encumbered with several heads of coral having from a half to one fathom water upon them. Entering the passage a sharp look-out is necessary to avoid the shoal heads, and a sailing vessel should be under easy canvas.

Leading mark.—The V-shaped notch of a double-summit hill on the western part of the island, kept open to the eastward of a conspicuous block of rock upon the shore, will lead to the anchorage. This is the native leading mark, and was used by the French vessel of war *Railleur*.

Anchorage.—The few ships which frequent the island, anchor at the entrance of the passage, but with winds northward of East a heavy sea rolls in, and with North or North-west winds it would be unsafe anchorage. Eastward of the passage, and nearer the reef than the land, the anchorage appeared to be better at all times, but there would be danger to a large ship attempting to beat up.

At the western extremity of the island is a large deep bay, affording excellent anchorage in all winds, which can only be reached by steam-vessels, in consequence of two large coral patches lying between the reef and the island.

No water is to be obtained at Vavitao, there being only a few springs used by the natives.

TUBUAI ISLAND which lies W. by N. 95 miles from Vavitao, in lat. 23° 22′ S., and long. 149° 35′ W., is high, and lies E.N.E. and W.S.W.; from the northward it shows as two islands, which on a nearer approach are seen to be joined by low land.

Reef.—Tubuai, like Vavitao, is surrounded by a reef at a distance of about a mile from the shore. On the north-east part of the reef are several islets, and on the north-west part is a large opening which forms the passage leading inside the reefs.

Anchorage.—The notch between two elevated peaks on the western part of the island, kept bearing South, leads to the anchorage, which is at the entrance of the passage leading inside the reefs. In bad weather this anchorage is safe only with winds from South to E.N.E. The holding ground is bad, the bottom being coral covered with a thin layer of mud. There is sufficient depth inside between the reef and the island for large vessels, but the passage is so blocked with coral as to be only available for small vessels.*

A little eastward of the passage is a village where the king of the island resides.

RURUTU or OHETEROA ISLAND, situated 105 miles W.N.W. of Tubuai, in lat. 22° 30′ S., long. 151° 22′ W., was discovered by Cook in 1769 during his first voyage.

This island is between 6 and 7 miles long north and south, 3 miles wide at the northern part, and volcanic in appearance; the mountains attaining a height of 1,300 feet, the lower parts of which are wooded.

The reef which surrounds the island is nearly contiguous to the shore. A small port, fit only for small craft, is said to be on the north-east part of the island.

Approaching the island from the northward, the most conspicuous objects are the church (a white building without a tower) and some white houses, among which is the two-storied house of the king, in front of which is a high flag-staff.

The inhabitants, numbering 700 (including 5 Europeans), are governed by king Tearu Arii. The natives are stated to be good natured and intelligent, and having some knowledge of shipbuilding and navigation.†

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* *See* Admiralty plan of Tubuai island anchorage, No. 2868.

† Berlin Annalen der Hydrographie, Heft 9 of 1883.

Anchorage.—Near the middle of the western side of the island is a bay 2 miles deep, which is safe and convenient for anchorage; the bottom is first seen at about 5 cables from the surrounding reef. With winds from the eastward vessels can easily make this bay.

RIMITARA ISLAND, lying 77 miles W. by S. ½ S. of Rurutu island in lat. 22° 45′ S., long. 152° 55′ W., is a small island about 2 or 3 miles in diameter and rising to a height of 315 feet in the centre. A coral reef closely surrounds the shore, through which there is no opening, and the island can only be approached in favourable weather, when landing may be effected opposite the villages on the east and west sides.

The natives export a small quantity of cocoa-nut oil and cotton, rear pigs and fowls, and cultivate vegetables and fruit.

HULL ISLAND.—This, the westernmost of the Tubuai islands, is a group of four small islands situated on a coral reef of triangular form, with its longest side N.W. and S.E. along which are three islands in a distance of about 3 miles, the fourth island lying at the apex of the triangle 2 miles N.E. of the centre one. The highest of the islands is 66 feet in height.

The reef surrounding the islands appeared to have no opening, and within the reef the water is shallow, the bottom being distinctly seen from outside. The north-west point of the group is in lat. 21° 49′ S., long. 154° 43′ W.

Landing is generally impracticable on account of the surf.

COOK ISLANDS.†

This group, which lies scattered over a considerable space, about 180 miles W. by N. of the Tubuai islands, was thus named by Admiral Krusenstern. There are nine or ten separate islands under independent chiefs, the greater number of which were discovered by Cook.

Cook islands seldom suffer from the effects of epidemics, and are generally healthy. The natives of all this group are much darker than the Tahitians, many of the islanders have a Mongolian type of face. The people of Aitutaki speak the same language as those of Rarotonga. Their houses are built of coral, whitewashed, with thatched roofs, and present a very picturesque appearance from the sea.

WINDS.—This group of islands being so near the limit of the trade winds, steady south-easterly breezes must not be expected; but they are most frequent between May and October, both included; during the remainder of the year, S.W. and westerly winds, which often blow as gales for several days in succession, are frequent, and cause a heavy surf on the western or usually lee sides of the islands.

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* Paris, Annonce Hydrographique, No. 18 of 1885.

† *See* Admiralty charts:—Pacific ocean general, No. 2683; Pacific Ocean, S.E. sheet, No. 783.

Hurricanes occur about once every seven years, but these storms are very local, the worst months are from December to March inclusive. Commencing at N.W. to North, ending at S.E., they do immense damage.

CURRENTS.—In the vicinity of this group the current will generally be found setting to the westward, at the rate of about half a mile an hour, but influenced in rate by the force of the wind.

MANGAIA, the southernmost island of the group, is of coral formation, but otherwise differs from most of the South Sea islands. It is about 650 feet high, and at a distance appears quite flat; there is a fringing reef all round about 2 cables from the shore and about 2 feet above high-water mark, but with no passage for boats. Boats anchor outside the reef, on a ledge, and canoes come off for passengers, &c.; the natives then look out for the rise of the swell and land the canoes on the reef, jump out quickly, and drag the canoe across the reef to land, before the receding sea can sweep it back into deep water. It is not always safe to attempt a landing, few accidents however occur.

Ships can approach the edge of the reef to within a cable, as there are no outlying dangers.

In 1880, the government of the island was divided between two kings; the population number about 2,000, of whom half live near the mission station of Oneroa, on the west side, where there is a landing place; the remainder being distributed between two other villages, each of which has its church and school. Schooners visit the island about every ten days, chiefly from New Zealand, and export coffee, cotton, copra, and tobacco. The trading is done in a market place set apart for the purpose, but no foreigner is allowed to settle on the island.*

RAROTONGA.—This island lying about 100 miles W. by N. of Mangaia, is 7 miles in length, 4 miles wide, and 2,920 feet in height, and is surrounded by the usual barrier reef. In appearance it somewhat resembles Tahiti, with the mountains rising up into pinnacles and fantastic peaks, and covered with vegetation.

The village of Avarua on the north-west side is easily distinguished from seaward; the anchorage off it in 12 fathoms black sandy bottom, 5 or 6 cables from the shore, suitable for vessels of about 100 tons, is sheltered from southerly winds, but dangerous with winds from the northward. Small trading schooners moor 2 cables from the beach in about 5 fathoms.

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* Navigating Lieutenant G. D. Lee, H.M.S. *Turquoise*, 1880.

There is anchorage to the eastward of Avarua, off the north side of the island in 15 fathoms about 3 cables from the beach, with the two highest peaks in line S. ¾ E.; it is protected from south-easterly winds by the N.E. point and the reef off it, but should the wind shift to the northward a swell sets in and the anchorage would not be safe except for a steam-vessel with steam ready.*

Large vessels standing off and on should be careful not to get too close inshore, especially on the west side of the settlement, as there is a considerable set on-shore, and several ships have been wrecked, there being deep water, and no anchorage close to the edge of the barrier reef.

Landing is effected by passing through a gap in the reef, nearly opposite the Queen's house.

About half a mile to the westward of the Queen's house, there is an entrance to a harbour capable of accommodating eight vessels of about 50 tons. The southernmost and highest peak S.E. ½ S., on which bearing it appears notched at the top, leads to the entrance. There are also breaks in the reefs opposite the mouths of the principal streams.

South Sea island cotton is grown, about 250 acres of land being under cultivation in that plant. A ginning machine is erected near the settlement, where the cotton from the Hervey group is sent previous to its being shipped off either to New Zealand or Tahiti. Coffee of a good quality is also grown, and forms one of the chief exports.

The island is in fortnightly communication with Auckland, and telegrams have been received from London in 12 days.†

A queen is the sovereign, and the form of government is the same as at Mangaia. The native population in 1884 was 3,000. In 1883 there were about 70 white people on the island, including some Chinese.

The Rev. Mr. Chalmers (L.M.S.) has an institution at Avarua for the education of native missionaries, many of whom have been sent to the outlying stations at Humphrey (Monihiki), Reirson (Rokohanga), and Danger (Puka-Puka) islands, lying to the northward of this group.

Supplies.—Fresh beef, yams, &c. can be obtained at moderate prices, also fowls and turkeys.

Water may be obtained from a stream flowing into Avarua bay.

MAUKI ISLAND, the easternmost of the group is low and wooded, about two miles in diameter and nearly circular, the tops of the trees being estimated at 120 feet above the sea, which render it visible from the masthead from a distance of about 17 miles.

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* Navigating Lieutenant J. R. H. MacFarlane, H.M.S. *Constance*, 1884.

† Captain F. P. Doughty, H.M.S. *Constance*, 1884.

Mauki island is reported to have no anchorage, but canoes come off in fine weather to communicate with passing ships. The reef does not appear to extend beyond a mile from the shore; the west side is clear of dangers and may be approached to within 2 or 3 cables. The landing place is on the barrier reef on the west side, close to a flagstaff and immediately below a house almost hidden by the trees.

The large clump on the southern part is in lat. 20° 7′ S., long. 157° 22′ W.

The island is governed by three kings or chiefs. The natives are a fine race, pleasant in face and merry in disposition; in 1884 they numbered about 400. The island produces copra and cotton for export, for which a schooner from Auckland calls at regular intervals.

The village is more than a mile from the landing place, and the church is a fine specimen of native work.*

MITIÉRO ISLAND, which lies about 22 miles N.W. by W. of Mauki island, is small and covered with verdure; near the centre is a clump of trees the tops of which are 92 feet above the sea, visible from the masthead from a distance of about 16 miles.

It is surrounded by a barrier reef, outside of which there are apparently no dangers; and there is no anchorage. On the west side there is a hut and flagstaff among the cocoa-nut trees which marks the landing place through the reef, but the surf is too heavy to admit of ships boats using it.

In 1884, the population numbered 275.*

The white tomb (a conspicuous object on the west coast of the island) is in lat. 19° 49′ S., long. 157° 43′ W.

ATIU or VATIU ISLAND, discovered by Cook in 1777, is about 20 miles in circumference; the highest point which is 394 feet above the sea is in lat. 19° 59′ S., long. 158° 6′ W., and lies about 22 miles west of Mauki.

The formation of this island much resembles Mangaia, and a reef closely fringes the shore. The northern side presents a bold rocky cliff shore about 30 feet high, intersected by small sand bays between the rocky heads. On the cliff above these bays some roads may be seen cut through the jungle into the interior. There is a landing place for canoes on the west side, which is marked by a flag-staff; and a village and church show conspicuously on the top of the ridge, about a mile and a half from the landing place.

A considerable number of vessels call here, and it is stated that temporary anchorage for small craft may be obtained on a small patch, in 16 fathoms, on the north side of the island.

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* Captain F. P. Doughty, H.M.S. *Constance*, 1884.

The population in 1881 numbered about 1,400, governed by three kings or chiefs.

TAKUTEA or FENUA ITI, is a small uninhabited island about 3 miles in circumference, with a white coral sand beach protected by a fringing reef, lying about 11 miles N.W. of Atiu.

This island is well wooded with cocoa-nut palms and other trees, the tops of which are about 50 feet high, and render it visible as far as the landing place at Atiu.

Heavy breakers extend some distance from the east point. There is no anchorage, and the only place where landing appeared practicable was on the N.W. side where there is a barrier reef close to a few ruined huts.*

The centre is in lat. 19° 49′ S., long. 158° 16′ W.

HERVEY ISLANDS, situated about 45 miles N.W. by W. of Takutea, are two small low islands named Manuai and Auotu, lying 5 or 6 miles north-east and south-west of each other, and surrounded by a coral reef into which there is no passage.

These islands are well wooded, the tops of the trees being about 60 feet above the sea. The settlement is on the north-west side of Manuai, the larger island, where there is landing through a small and shallow passage in the barrier reef.

In 1884, there were 23 inhabitants left in charge of the islands by the king of Aitutaki who claims them.*

AITUTAKI, the north-western island of the group, lying about 55 miles W. by N. of the Hervey islands, was discovered in 1798 by Captain Bligh, of the *Bounty*, a few days before the mutiny; it is about 14 miles long in a north-east and south-west direction, and 360 feet high, surrounded by a barrier reef, through which there is only a boat passage situated opposite the mission station at Arutunga on the west side of the island. Anchorage for small craft is reported to be obtained outside the reef.

The northern end of this island stands out boldly and shows well, somewhat in the shape of a quoin on approaching from the eastward.

The island is well wooded with the exception of a smooth conical mound on the north side, which slopes gradually to the southward.

The barrier reef extends to the south-westward for 7 or 8 miles, and on the outer edge eight islands were counted, covered with trees, and from 20 to 60 feet high, also several sand cays upon which the sea breaks heavily.

A small wooded island 20 feet high, with a reef extending one mile west of it, forms the western elbow of the barrier reef.

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* Captain F. P. Doughty, H.M.S. *Constance*, 1884.

The missionary establishment at Arutunga consists of two white buildings, the church and school-house. The passage through the reef opposite them is somewhat difficult to distinguish, being narrow, tortuous, and full of eddies, but may be found by bringing the mission house to bear S.E. ½ S. when it will appear open.

The climate is said to be healthy, cotton and coffee are cultivated, and cocoa-nut oil is exported.

Pigs, fowls, fruit, &c. may be obtained at moderate prices, and there are a few cattle of a small but good looking breed on the island. Water is difficult to be procured.

The government consists of three chiefs and a number of sub-chiefs. The population in 1883 was 2,000; the births are far in excess of the deaths. The inhabitants are very hospitable and kind.

The mound on the north side of the island was determined by sea observations from H.M.S. *Alert* to be in lat. 18° 57½′ S., long. 159° 49′ W.

CHAPTER II.

SOCIETY ISLANDS.

VARIATION IN 1885.

Tahiti - - -	8° 5′ E.

This important group of islands consists of the celebrated island of Tahiti and several smaller islands. There appears to be but little doubt that Tahiti was first seen by Quiros in 1606, but like many other Spanish discoveries was unknown or unnoticed by the rest of the world, so that when the *Dolphin*, Captain Wallis (sent by George III. to make discoveries in the South Seas), reached it on June 19th, 1767, it was supposed to be a new discovery, and named King George Island.*

Captain Wallis sailed along the eastern side and anchored off the north-east shore. On the 23rd he discovered Matavai bay, and in passing it struck on the detached coral bank now called *Dolphin bank*, the ship was, however, got off safely, and anchored in the bay, when Lieutenant Furneaux landed and took formal possession in the name of George III. by hoisting a flag. On April 2nd, 1768, M. de Bougainville visited the island in the *Boudeuse* frigate and a store ship, leaving on the 14th, and naming it Nouvelle Cythére.

The next visit was the most important, as it made the world more intimately acquainted with the group than the former ones did, besides filling important vacancies in science.

It had been recommended that the rare occurrence of the transit of Venus across the sun's disc should be observed at points as far as possible apart; for this purpose Lieutenant James Cook, with an efficient staff of scientific observers were sent in the *Endeavour* to make the necessary observations. They arrived at Matavai bay on April 12th, 1769, and on the 3rd of June following, the transit was observed near the north point of the island, which thus became one of the best determined positions in the Western hemisphere and was named point Venus. Cook surveyed the chief island and discovered several of the north-western group, giving them the name of Society Islands.

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* *See* Admiralty charts:—Pacific ocean, general, No. 2683. Pacific ocean, S.E. sheet, No. 783. Paumotu or Low Archipelago, No. 767. Tahiti and Murea, No. 1382. Harbours in Society islands, No. 526.

In 1772, the Spanish government despatched an expedition to Tahiti under Don Domingo Bonecheo, and his report on returning caused the attempt to colonise to be made, and in 1774 Bonecheo was again sent with missionaries and other means of establishing a settlement.

Between these visits of the Spaniards, Cook had, in company with Captain Furneaux in the *Resolution* and *Endeavour*, again visited Tahiti and heard of the Spaniards' visit, he also visited it in his last voyage in 1777.

The subsequent events which distinguished the island are generally known; eleven years passed without any intercourse with Europe, when Lieutenant Bligh, in command of the *Bounty*, having been commissioned by George III. to transport breadfruit trees to the British West Indies, arrived at Matavai bay on October 26th, 1788. The subsequent meeting and return of the mutineers to Tahiti on June 6th, and a second time on September 22nd, 1789, is well-known.

The *Pandora* frigate, Captain Edwards, sent in search of the *Bounty* and her mutineers, arrived on March 23rd, 1791, and took away those who had remained, fourteen in number.

Vancouver also visited Tahiti in the same year, thus most of the great voyages to which we owe our knowledge of the Pacific have made this point.

In 1842, on account of hostilities offered to French missionaries, the frigate *La Venus*, under Admiral Du Petit Thouars, obliged Queen Pomare to sign a treaty allowing liberty to all French subjects, and in 1844 Captain Bruat, in the presence of a powerful fleet, landed a strong force, hauled down Queen Pomare's standard, and hoisted the French flag, taking possession of the island in the name of Louis Philippe the king of France.

The exports, consisting principally of cotton, copra, pearl shells, fungus (edible), oranges, cocoanuts, vanilla, and lime juice, amounted to 118,000*l.* in 1883, and the imports to 175,000*l.* The number of vessels of all nations that entered the same year was 205, amounting to 20,911 tons, as against 254 vessels of all nationalities with an aggregate tonnage of 24,972 tons in the preceding year.

The pilotage charges, which are rather heavy, are as follows:—

For merchant vessels per fraction of 10 tons:

	frs.	cents.
From 30 to 100 tons - - - -	4	0
" 101 " 400 " - - - -	3	50
" 401 " 500 " - - - -	3	00
" 501 " 1,000 " and upwards - -	1	50

For men-of-war:	Frs.	cents.
Line of battle ship	250	0
Frigate	200	0
Corvette	150	0
Small craft	75	0

The money is paid in to the Treasury, the pilots receiving a fixed salary.

The government accounts are kept in francs and centimes; but the merchants find dollars more convenient, and the principal money in circulation is the Chilian dollar.

The islands of Maitea, Tahiti, Murea, Tetiaroa and Tapamanu are under French protection, the remainder are under independent chiefs.

CLIMATE.—The climate of the Society islands is hot and damp at all times of the year; but on account of the latitude being well to the southward, the difference of temperature between summer and winter is sensible, especially during the night.

The maximum temperature by day rarely exceeds 94° (Fah.) during the hot season, in January, and seldom falls below 82° in June; the average is about 86°. The minimum temperature at night falls but little below 81° in the hot season; but in the cool season it often falls to 70° and sometimes 63°.

The climate is very healthy for Europeans who are not exposed to any of the sicknesses common in hot countries. Sunstroke is not more frequent than in Europe.

WINDS.—By their latitude, the Society islands are situated within the limits of the S.E. trades, and at all times of the year the wind has a tendency to blow from the eastward, often remaining between east and S.E., or east and N.E.

Various causes, however, disturb the regularity of the easterly winds; one of the principal is the vicinity of the Paumotu archipelago, which interrupts the regularity of the trade wind; but when the trade is strong and well established it blows across these low lagoon islands and continues its course to the Society islands; some violent squalls, peculiar to the Paumotus are the only evidence of the struggle. If, by any chance, the trade should be light to the eastward of the Paumotus, it is stopped by these islands; the calm which results tends to increase the temperature of the lagoons and the consequent upward movement of the air, and cold masses of air from southern regions naturally tend to fill up the vacuum.

Thus, at Tahiti, after a day or two of calm, the breeze springs up from the S.W., carrying masses of cold air towards the Paumotus. This cold air penetrating into the hot and moist tropical regions, induces an abundant condensation, a rainy season, and squalls.

During May, June, July and August, the sun is well to the northward, and its action towards heating the water of the lagoons is so much the less powerful since the general temperature is at its minimum; at the same time the S.E. trade is at its full strength, blowing almost without interruption, and the Paumotus do not cause it to vary much from S.E. to E.N.E. When from the S.E. it is strong and squally, becoming lighter as it shifts to east or E.N.E., returning to the S.E. after an interval of calm.

These periods last from one to two weeks, separated by a day or two of calm; and it is seldom that the wind blows from the westward during this season. In every case the winds from the westward are weak and of short duration.

In proportion as the sun moves to the southward, its action upon the Paumotus increase, the trade loses it strength, veering to E.N.E. and sometimes N.E. Then, in the parts to the westward of the Paumotus, the shifting of the wind is more marked, the periods of the trade of shorter duration, calms more persistent, and winds from the westward more frequent and stronger; and at last during the months of December, January, February, March, and April, the southern summer, the trade wind becomes very weak. The heat is greatest upon the Paumotus, and the evaporation of the lagoons attains its greatest intensity, so that during this season the Society islands are nearly always subject to variable winds; and breezes, sometimes fresh from the westward, alternate with calms, storms, and returns of the trade.

REVOLVING STORMS.—Between the months of December and March this part of the Pacific ocean is traversed by revolving storms, which sometimes attain, though rarely, the strength of the cyclones in the China sea and Indian ocean.

These storms often pass over the islands to the westward of Tahiti, and blow with violence among the Cook islands.

There is no instance of the centre of one of these storms passing over Tahiti; it is probable that the high mountains of the island divert them; but their passage is frequently proved among the Paumotu archipelago, or well to the southward between Tubuai and Tahiti. The cyclone of September 1877, which ravaged the islands of Anaa and Kaukura is the most violent on record.

To an observer at Tahiti the passing of one of these storms presents the following appearances:—Should the centre be passing to the northward, the wind begins from S.E. or east and shifts to the N.E. like the trade wind; but the falling of the barometer, the appearance of the weather which is threatening and squally, foretell the nature of the coming storm. The wind freshens as it shifts to the north and N.W., and drops as it becomes more westerly and the storm recedes. The sea is very heavy upon the north shore of the island, and especially in the pass at Papiete. In this roadstead, the wind comes down the mountains in violent squalls, with intervals of calm accompanied by torrents of rain.

Should the centre be passing to the southward, the wind commences at S.W., increasing in strength as it shifts to the westward, begins to drop at N.W., and dies away between N.W. and north. The sea is very heavy upon the south side of the island.

These tempests, as they pass to the northward or southward of Tahiti, give place to thunderstorms and heavy rains all over the island, but especially at Papiete. From this is derived the name of the rainy season given to the months when they are most frequent. They are most common in the summer, but occur with a greater or less violence all the year round.

CURRENTS.—The current among the Society islands is not very regular; but, on clearing the coast, one can generally count upon finding the current setting in the direction of the prevailing wind, and a varying rate which is as much as 10 or 15 knots a day, with a good breeze. Easterly winds being the most frequent, the general set of the current is to the westward.

TIDES.—At Papiete, high water takes place every day between noon and 2 p.m. This curious phenomenon appears to be altogether peculiar to this part of the coast, and to be caused by a particular combination of the tidal streams.

Everywhere else among the Society islands, the tides are governed by the moon.

The rise and fall is very small.

PRODUCTS.—All the productions of tropical countries grow well in the soil of Tahiti and Murea, and with but little cultivation, produces cotton of good quality, cocoa-nuts from which copra is made, sugar, coffee and vanilla. The bread fruit and a species of banana are the staple food of the natives; oranges and guava trees form regular forests; the mango, recently imported, the banana, and all the fruits and vegetables of the tropics flourish in abundance; and for several years some European vegetables have been grown as well.

Cattle are few in number; pigs and poultry in great numbers; sheep and goats are numerous.

MAILS.—There is a monthly postal service between Tahiti and San Francisco, which is carried on by sailing schooners, fitted for carrying passengers. These vessels leave San Francisco on the first of every month, calling at the Marquesas, and arrive at Tahiti in from 25 to 35 days. They leave Tahiti again on the 12th of each month and take from 25 to 40 days to return to San Francisco without touching at any port.

A contract was concluded in 1882 for the establishment of a line of French steamers, running once a month between San Francisco and Tahiti, the passage to occupy 21 days, calling at the Marquesas, and leaving San Francisco on the first of every month. The date when this service will commence has not yet been fixed.

MAITEA or MEHETIA ISLAND, in lat. 17° 53′ S., long. 148° 5′ W., is the easternmost of the Society group, circular in form, 1,597 feet high, and about 7 miles in diameter.

The north side is remarkably steep; on the south side the declivity is more gradual. On the eastern side cocoanut and other trees abound.

Near the east end are two remarkable rocks, and a reef extends to the eastward about 1½ miles.

The only safe landing place is on the S.E. side opposite the native huts, at the end of a pathway leading to the village; even here great caution should be observed as there are numerous rocks, and it is better to get the natives to point the spot out before attempting it.*

Supplies.—Pigs, fowls, and fruit may be obtained.

TAHITI.—This, the most important island of the group, is 33 miles in length in a north-west and south-east direction, and is an elongated range of high land, which, being interrupted in one part, forms an isthmus about 1½ miles in width which connects the two peninsulas, the smaller of which is named Taiarapu.

From a low margin of sea coast, the land rises to a very considerable height on both extremities of the island, where some highly fertile valleys intersect the ranges in different parts.

The highest mountain, named Orohena, in the northern peninsula, is 7321 feet in height, and several others vary from 3,000 to 6,000 feet, from which ridges diverge to all parts of the coast. An excellent road has been completed all round the island called Broom road.

The summits of this island are frequently enveloped in clouds, so that caution is necessary in making the land at night, and if coming from North or East, the light on point Venus should be first sighted before closing the coast.

A coral reef encircles the island at a distance of from one to two miles, and within it are several good harbours, the principal of which is Matavai bay on the north side of the island.

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* Commander J. Brown, R.N., yacht *Sunbeam*, 1876.

Winds.—Along the coasts of Tahiti, the winds which prevail to seaward are modified by the high mountains of the island and the action of the land and sea breezes; the prevailing winds being from E.S.E. to E.N.E.

If the wind is from E.S.E. it divides on striking the Taiarapu peninsula, the part which passes to the southward blows all along the S.W. coast of the peninsula and the south coast of Tahiti as far as Maraa point, when it turns from the coast and blows towards the south end of Murea.

The part which passes north of the peninsula blows along the land as far as point Venus, where it is an easterly wind; there it leaves the coast and blows towards the north end of Murea.

Between Maraa and Venus points there are generally calms and local breezes which extend for a short distance into the Murea channel. The dividing line between the winds to seaward and the calm is very clearly marked.

Should the wind be from east or E.N.E. it strikes the N.E. coast of the peninsula, and the coast between Teahupu and Teputa becomes becalmed, while a breeze crosses the isthmus of Taravao and blows from the eastward along the south coast of Tahiti as far as Maraa point when it turns away from the coast and leaves a calm between Maraa and Faa points.

In proportion as the wind veers to east and E.N.E. the line of demarcation between the breeze and calm which begins at point Venus, approaches the land again and blows all along the coast as far as Fareute point, from whence it turns towards the point of the reef off Faa, leaving the roadstead at Papiete in calm.

At Papiete, land and sea breezes usually prevail, the former commencing about 8 p.m. and lasting all night until 7 a.m.; the sea breeze generally sets in about 9 a.m. and blowing from N.W. dies away about 5 p.m.

There is much danger to sailing vessels using the pass at Papiete, because the wind may fail them suddenly, and the current, which is nearly always running out, sets them on the reef. The land breeze is more regular and steady than the sea breeze and can be taken advantage of for going out through the pass without danger.

Currents.—Along the north coast of Tahiti the general set of the current is to the N.W., and on the south coast to the S.E. With westerly winds the current is often reversed.

To the westward of Papiete and between the two islands, its general direction is south; in fine weather the rate of the current is about one knot an hour, but in bad weather it sometimes attains as much as 3 knots.

Point Venus, the northern point of Tahiti, has probably had more extensive series of observations made on it than any other place in the

Pacific ; as has been previously stated, Cook observed the Transit of Venus here in 1769, the longitude deduced from his observations being 149° 26′ 15″ W. ; from observations made during his second voyage, it was found to be 149° 28′ 23″ W., nearly identical with what Captain Beechey made it in 1826. The French give the longitude as 149° 29′ 0″ W.

It is a long low point extending to the northward for about a mile from the foot of the mountains, and forms a plain completely wooded and covered with huts, and intersected by a pretty river which rises from the Tuauru valley.

A Roman Catholic church is situated at 2¾ cables S.S.E. of the lighthouse; its steeple shows above the trees and can be seen from all directions.

A reef awash extends in an arc to the northward of the point, to about a third of a mile from the beach, but there are probably some shoals a short distance to seaward of the line of breakers. Upon the eastern portion of this reef is a small islet lying 3¼ cables E.N.E. of the lighthouse.

Along the shore there is a boat passage between the reef and the beach.

LIGHT.—The lighthouse on point Venus is a square white tower 72 feet high, and from it is shown a *fixed* white light elevated 82 feet above the sea and visible from a distance of 15 miles.

Coast.—To the westward of the lighthouse the coast forms a beautiful sandy beach, slightly curved and extending to the south-westward for about a mile. This beach is bordered by huts and terminates at the foot of a steep hill 236 feet in height called mount Tahara, which is covered with brushwood and cocoa-nut trees, and projects into the sea as a steep cliff. Beyond mount Tahara the coast sinks lower ; the level part is wooded and bordered by a sandy beach broken here and there by coral banks as far as the low point of Utuhaihai, situated rather more than 2 miles from point Venus.

Matavai bay, situated between point Venus and Utuhaihai point, and enclosed to seaward by a series of banks, is completely exposed to the swell from seaward which always sets in, and landing is often dangerous for boats. It affords good shelter with winds from S.W. through East to N.N.E., but is dangerous with winds from N.W. and West. From December to April it may be considered a safe anchorage, but during the remainder of the year, when westerly winds often occur, it should be avoided, as a heavy sea sets in ; and in all seasons vessels should be prepared to leave when the wind shifts to the northward of N.E.

Banks.—Separated from the reef off point Venus by a channel about three quarters of a cable wide, with a depth of 12½ fathoms, is Dolphin bank, on which H.M.S. *Dolphin* struck in 1767 ; the least water on this bank is 13 feet, which lies about 5 cables W.S.W. of the lighthouse.

A channel about one cable wide separates Dolphin bank from the chain of reefs extending to the S.W. for about 1¼ miles, called the Toa Tea reefs. There are several channels between these reefs, and the depth is very irregular; on some of the coral heads are only 16 and 20 feet of water.

Between the Toa Tea reefs and the shore a little to the westward of mount Tahara is the Mahoti reef, upon which are depths of 2 fathoms, having a small patch with a depth of only 5 feet on the west side.

With a heavy swell from seaward there are breakers upon the Dolphin bank, Mahoti reef and some parts of the Toa Tea reefs.

Anchorage.—In Matavai bay anchorage may be obtained anywhere with depths of from 8 to 16 fathoms, sand; the best is in 11 fathoms, with the church near point Venus bearing E. ¾ N.

Directions.—In making for the anchorage with easterly winds, a sailing vessel should pass close to the reef off point Venus, but keeping clear of the depth of 2 fathoms extending for a short distance to the westward of the breakers. These shoals will be cleared by steering S. ½ W. for the perpendicular cliff which terminates the western extremity of mount Tahara. When the lighthouse comes in line with the north point of Motu Au, luff quickly to S.E. ½ S., and shortly after to S.E. ¾ E. as soon as the point of breakers has been passed, and anchor when the church bears E. ¾ N.

This manœuvre, which is easy when the wind is E.N.E., is more difficult with an east wind, because it is necessary to pass as close as possible to the reef off point Venus, and at the time for luffing to enter the channel, to expect a current setting along the reef towards the Dolphin bank, on which the sea often breaks.

It is also possible to enter by the channel south of this bank, and by luffing, come to an anchor in 8¾ fathoms, or else to tack into the bay in order to reach the anchorage mentioned above.

Coast.—Utuhaihai point is low and covered with cocoa-nut trees and iron-wood. The tomb of the Pomarés is situated here by the side of a Protestant church, a large white building visible from seaward.

From off Utuhaihai point a reef awash extends without a break to Taunoa pass, a distance of 1½ miles, and from 3¾ to 4½ cables from the shore.

Papawa harbour.—Inside this reef is a large basin obstructed by banks of coral, between which is a winding channel with depths of 8 to 11 fathoms, sand, about one cable wide, which is called Papawa harbour.

A pass about half a cable wide which opens into Matavai bay opposite Utuhaihai point gives access to this harbour.

The anchorage is N.W. of the king's house, a large European building with a verandah, close to the beach, and about 3 cables S.W. of Utuhaihai point.

Coast.—From Utuhaihai point as far as Fareute point, a distance of about 3 miles, the coast is low, and the foot of the mountains receding into the interior leaves a plain of more than half a mile wide, well wooded, cultivated, intersected by many pretty rivers and with numerous huts.

Taunoa pass.—This pass is about 1½ cables wide and clearly marked by the edges of the reef awash on either side. However, on the East side is a rock with only 9 feet of water, and on which the sea sometimes breaks, lying about 150 yards N.W. of the point of the reef. Another rock is situated inside the pass near the west side, about half a cable S.S.E. of the west point of the reef, and marked by a white beacon.

This pass may be recognised by a remarkable rugged peak, called Diademe mountain, which will be seen through a deep valley, bearing S.S.E. ¼ E. when abreast the entrance.

Taunoa pass is one of the best in Tahiti, as it is wide and clear, with no dangerous bar, and the breeze is more regular than at Papiete. Sailing vessels going to Papiete often take advantage of entering by the Taunoa pass and using the narrow but well beaconed channel which connects Taunoa and Papiete.

The current nearly always run out through the pass, but is not very strong.

Beacons.—Two white pyramidal beacons are placed on the shore close to the beach, which kept in line on a S.E. ½ S. bearing lead through the middle of the pass.

Anchorage.—The best anchorage in Taunoa harbour is with the two beacons in line, and Arahiri point, on the east side of the harbour E. by N. ¾ N. Small vessels can anchor nearer the eastern reef, where the water will be calmer. The bottom is black sand.

The anchorage in Taunoa harbour is good with easterly winds, but as the pass is wide, the swell sets in and rolls upon the sandy beach at the bottom of the bay. With strong N.W. winds it will be dangerous, and landing impossible for boats even by entering the reef either one side or the other.

Taunoa channel, which connects Taunoa and Papiete harbours, is well beaconed, having white beacons on the south side of the channel and red beacons on the north. The channel, which is very winding is about 1½ miles in length, and it would be imprudent to use it without a pilot. Vessels drawing as much as 19 feet can use it with safety, but large vessels will experience some difficulty in making the sharp turns at the eastern end of the channel.

At the Taunoa end, are two banks of coral which divide it into three narrow passages in which are depths of 6½ fathoms. A white beacon marks the north point of the northern patch, and a red beacon the south point of the southern patch; between them, an anchor is placed between the two beacons with the fluke above water to permit making fast a hawser.

PAPIETE HARBOUR, which is the most important, and affords the best shelter in the island, is enclosed between the shore and barrier reef, through which there is only a narrow passage. The northern half is somewhat obstructed by coral reefs, but the southern part is clear of dangers, about one mile in length N.E. and S.W. and 3 cables broad, with depths varying from 8 to 19 fathoms, sand and mud.

From Fareute point, the north-east point of the harbour, the coast turns sharply to the eastward for about 1½ cables, then curves to the southward for nearly 4 cables, and then trends W.S.W. for about 1½ miles to Nuutere point.

On approaching from seaward the first object in the town which comes into view is the white steeple of the church, which is situated 4½ cables S.E. ½ S. of Fareute point, and overlooks the trees under which most of the other buildings are hidden.

Immediately over the town is a bare hill, named mount Faiere, which terminates in a plateau 236 feet above the sea, on which is a battery over which the French flag is generally hoisted. At 1½ cables N.N.E. of the battery is a semaphore station with flagstaff.

Pass.—The entrance into Papiete harbour is a break about 2¾ cables wide in the barrier reef, which is unfortunately so narrowed by the shallow water on either side, that the deep water channel is hardly more than 100 yards wide. On the west side of the pass is a bank extending from the reef for 1½ cables across the pass, upon which there is only 1½ and 2 fathoms of water. The sea nearly always breaks on this bank, which is called the bar.

On the east side a bank extends for three quarters of a cable into the pass, with depths of 1½ and 2 fathoms; on the western extremity of this bank a white nun buoy is moored. The two leading marks into the harbour cross about 20 yards to the westward of this buoy in 5 fathoms.

Unless having local knowledge, it is advisable for sailing vessels to take a pilot into the harbour, as he will be able to give information how the wind is at the anchorage, which is often different to the breeze outside.

Currents.—Outside the reef the current generally sets to the westward about a knot an hour, which should be borne in mind when about to enter.

The tidal streams are but little felt at Tahiti; the currents which prevail in the pass being due chiefly to the state of the sea upon the neighbouring reefs. The volumes of water thrown by the waves over the reef off Faa cause a current which runs out towards the pass to the N.E. and North; while the current from the water driven in over the Taunoa reef runs towards the pass in a W.S.W. direction along the inside edge of the barrier reef; so that the resulting current depends on the preponderance of one or the other of the currents which form it.

When the sea is heavy to the southward of the harbour and slight upon the northern reef, the current from Faa is the stronger and the current through the pass is more northerly; this generally is the case in the fine season. But when the swell comes from the north and breaks heavily upon the Taunoa reef, the westerly current prevails and the current through the pass is more westerly. Under these circumstances the pass of Papiete becomes very dangerous, as the sea is heavy, and the current, which sometimes attains a rate of 4 or 5 knots, sets right upon the bar.

Motu-uta is an island lying 3 cables S.W. by W. of Fareute point, between the shore and the outside reef. It is a sandy island, upon which a battery has been built and is planted with cocoa-nut trees, situated upon a coral reef awash, which is separated from the neighbouring reefs by deep channels. A gun is placed as a beacon upon the point of the reef opposite Fareute point.

Reefs.—Three other reefs awash, separated by deep channels lie south-west of Motu-uta, extending in a line in an E.S.E. direction from the pass. The western reef is marked by a gun on the western edge, and a white beacon on its south extreme. The other two reefs are each marked by a gun on their southern ends.

In the south-west part of the harbour is an isolated patch of coral called Soaotoi reef, lying about 2 cables from the shore.

Buoy.—Lying 2 cables S.E. of the pass is a rock with a depth of 4½ fathoms over it, marked by a nun buoy, painted red and white in broad vertical stripes.

Leading marks.—Two white obelisks, about 40 feet high, for leading through the entrance, are in line on a S. by E. ⅛ E. bearing, and are placed, one on the eastern edge of the Soaotoi reef and the other on the beach opposite.

Two wooden structures, 1¼ cables apart, and in line on a S.E. ½ S. bearing, on which *red* lights are exhibited at night, are placed, one on the eastern side of the masked battery, and the other rather higher up on the Broom road; the lower light shows as a pale red colour, and the upper dark red. A white mark is situated in the ravine on the same bearing and 5½ cables from the upper light.

Directions.—Papiete harbour presents no difficulty of entry for a steam vessel, and may be used by the largest vessels, except in gales from the north-westward. For sailing vessels, great caution is necessary especially in light winds, and a pilot should always be employed.

By night, sailing vessels should never attempt to enter, as they are almost sure to find the land breeze in the pass; but steam vessels can enter without fear as long as they know the marks.

For entering, bring the two obelisks in line S. by E. ⅛ E., and steer in on that bearing with good way on, leaving the white nun buoy in the pass close on the port hand. On passing the buoy, the two light-houses and white mark on the hill will come in line; haul up and steer with them in line bearing S.E. ½ S. and when past the buoy on the 4½ fathom rock, steer for anchorage as requisite.

Should the beacons for entering not be in their places, it will be sufficient to bring the distinctly marked slope of a peak in the interior to bear S. 54° E., and steer for it. On nearing the reef, the entrance will easily be found by the interruption in the breakers.*

Anchorage.—In all parts of the harbour anchorage may be obtained in from 8 to 19 fathoms to within half a cable of the shore. If intending to remain some time, it is better to moor, as the wind shifts about continually, causing a foul anchor.

Papiete harbour is convenient in many respects, but is subject to calms and much hot weather in consequence of being rather to leeward, and the trade wind being obstructed by groves of cocoa-nut trees.

Rain squalls seen in the direction of point Venus and a little to the southward of it, usually reach the anchorage; but those collecting over Aorai peak and the other heights seldom descend to the harbour.†

Papiete or Papeete, the seat of government of the Society islands, is situated at the foot of the highest mountains in the island, and extends from Fareute point for about a mile to the westward along the beach, terminating with a masked battery which is situated nearly opposite the pass. Various quays have been built which admit of the largest vessels going alongside and several consuls reside here.

Tug.—There is a small tug at Papiete which tows vessels for 3 miles from Motu-uta, charging 25 francs per 100 tons or fraction of 100 tons. To obtain her services it is only necessary to ask by the international code of signals, and the request is passed on by the semaphore station. This tug is generally absent from Papiete from 3 p.m. on Saturday to 3 p.m. on Sunday.

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* Berlin Annalen der Hydrographie, Heft 1 of 1879.

† Remark book, Lieutenant E. Fleet, H.M.S. *Gannet*, 1881.

Resources.—The French Government have an arsenal and small factory on Fareute point, where repairs to machinery may be effected on a moderate scale; and a quay adapted for heaving down vessels of all sizes.

There is no dry dock or patent slip, nor any convenient place to lay a vessel aground, the bottom being coral, and the tide range only one foot.

Supplies.—Beef of indifferent quality brought from the Marquesas and Sandwich islands may be obtained at 25 cents per lb., and good pork at 20 cents a lb., poultry is dear, vegetables and fruit cheap and abundant.

Water may be procured from a tank or brought off in bulk from the hydrants either at the arsenal wharf or the government wharf opposite the French flagstaff.

Coal.—The government has a coal depôt of about 2,000 tons; and a supply can generally be obtained from the firm of Goddefroy or the Society Commercial; it is chiefly Australian coal, the price being 13 dollars per ton.

Coast.—From Papiete pass the barrier reef trends for about 3 miles W.S.W. at one mile from the shore, then it turns sharply to the S.S.E. for 3 miles to Taapuna pass.

From Papiete to the Taapuna valley the foot of the mountains come close down to the sea, with here and there a narrow wooded plain between them and the beach. This coast curves slightly as far as the village of Faa, opposite which is a large wooded islet, named Motu Tehiri, and then trends at right angles to the southward as far as Punaavia.

Faa channel.—Between the outside reef and the coast is a channel about 5 miles long and from half a cable to 3¼ cables wide, with depths of from 6½ to 13½ fathoms, which connects Papiete harbour with Taapuna pass. This channel is accessible to the largest vessels; in the middle are several shoals which are plainly visible from the masthead.

The water thrown in by the surf breaking upon the reef, collects in this channel and escapes on one side by Papiete pass and on the other by Taapuna pass.

Taapuna pass is dangerous and not recommended. It is more than half a cable wide between the reefs awash, but is encumbered with banks, upon one of which is only 7 feet of water; between these banks there is only a narrow and winding channel of deep water.

The current always sets out strongly, especially when the sea is heavy upon the reef; at such times the surf breaks upon the shoals in the pass, which becomes a mass of breakers.

Directions.—In going out, it is necessary to keep very close to the reef on the north side, and steer west, thus passing over some depths of 13 feet, upon which a small vessel might touch with the swell. To follow the winding passage where there is more water, it is necessary to steer from aloft.

It would be very imprudent to attempt to enter this pass, and it is necessary to be sure of having a good speed to stem the current. Keep in the middle of the outer part of the entrance steering E.N.E., then turn to starboard and keep close to the reef on the north side.

It is better for a boat desiring to visit any place between Papiete and Taapuna, to enter by the Papiete pass.

Coast.—From Taapuna valley, the plain lying between the foot of the mountains and the sea becomes broader and is sometimes half a mile across. At 1½ miles south of Taapuna pass is Punaruu valley, which is an immense gorge cutting the mountains from top to bottom and penetrating to the middle of the island, where it opens out into a vast amphitheatre hemmed in by the peaks of Orohena, Aorai and Diadème, which are visible to seaward when opposite the gorge.

A river runs through this valley bearing the same name, whose deposits have formed Punaavia point and the bottom of the bay of the same name.

Upon the lower slopes on the left bank of the Punaruu are several blockhouses, constructed at the time when the island was taken possession of. Another blockhouse is on the shore at Punaavia point, and an iron bridge crosses the river about half a mile from the coast.

Reef.—From Taapuna pass the barrier reef approaches the coast and joins the beach 6 cables north of Punaavia point. Between Taapuna and this point there is a passage for boats between the reef and the shore. A narrow gap named Taipari pass allows the water to escape which accumulates by the surf breaking on the reef.

Punaavia bay is the name given to the part of the coast, about 6 cables long, where the barrier reef ceases and forms a small bight where anchorage may be obtained in depths up to 27 or 33 fathoms, sand and mud.

In the north part of the bay, opposite the place where the barrier reef ends, there is a coral reef about 3 cables long north and south at half a mile from the shore, upon which are depths varying from 6½ to 13 fathoms.

At 2½ cables N.W. by N. of Punaavia point is a bank of 16 feet called the Phaeton bank.

Anchorage.—The best anchorage is half a mile from Punaavia point in from 8 to 11 fathoms, sand and mud, with the blockhouse on the point bearing S. by E.

The anchorage of Punaauia is an open roadstead, the heavy swell from the north-west beats upon the coast, and landing is nearly always difficult. The winds which blow along the land do not generally reach the anchorage, and vessels intending to leave under sail have usually to wait for the land breeze.

Current.—In Punaauia bay the current always sets from the point and is caused by the flow of water accumulated inside the reef which extends to the southward.

Boat channel.—A double channel situated close to the land at Punaauia point allows boats to pass inside the reef, where they can navigate with shelter as far as Paea, 4 miles to the southward, where there is a break in the reef of about one cable.

Paea.—This part of the coast is easily recognised, and Orofero valley, behind the village, is the only one which appears to penetrate into the middle of the island after leaving Punaauia. Near the shore the chief house in Paea may be distinguished behind a row of fine iron-wood trees.

Boat passages.—On both sides of the gap opposite Paea are boat passages inside the reef; they are always dangerous and become impracticable when the sea is heavy. The northern is the better of the two, but the southern is a regular rapid where the current sets out with great velocity.

Only very small vessels ought to anchor in the gap in the reef, and then only in cases of absolute necessity, as it is a dangerous place.

Coast.—From Paea the reef trends without a break for 3½ miles to Maraa point, at about half a mile from the land, and rounds the point at about 6 cables, where it is not so steep-to as usual, so that it would be prudent not to approach within a cable of the breakers.

Maraa point, which is low and wooded, and projects 200 or 300 yards from the foot of the mountains, may be easily recognised from seaward. In the distance the mountains seem to form a gentle declivity, which falls suddenly towards the sea by a steep slope of 300 to 600 feet in height.

Maraa pass.—In the middle of the rounded part of the reef, and S. ½ W. from Maraa point is a pass about half a cable wide, open to the S.S.W. At the entrance, the points of the reef on each side extend for nearly a cable to seaward of the breakers.

For entering the pass, approach the middle steering N. by E. ½ E., and when close up, keep close to the eastern reef so as to pass to the eastward of two coral patches, on the southern of which is only 13 feet of water. A small vessel may pass to the westward of these patches which are separated from the western reef by a narrow but deep pass.

The current in the pass depends upon the state of the sea on the neighbouring reefs, and sometimes attains a rate of 4 to 5 knots: on meeting the sea, it breaks right across, when entering becomes impracticable.

Anchorage.—Opposite the pass, near a little water-course, anchorage may be obtained in 11 fathoms, sand, with Maraa point bearing W. ¼ N. about 2½ cables.

Reefs.—From Maraa pass the barrier reef extends to the eastward for 3½ miles, about three-quarters of a mile from the shore, inside which there are a series of large basins with deep water, strewn with coral patches, with deep water between, where anchorage may be obtained almost anywhere. Besides Maraa pass there are two other channels through the reef, Topiro pass, 1¼ miles east of Maraa pass and Ava-iti pass two miles further east; they are small and deep, but only practicable for boats in calm weather, and when the sea is heavy they are very dangerous.

At Terehe about a mile to the eastward of Ava-iti pass there is a boat passage into the reef opposite the chief house and church which are visible from seaward; the current runs out strongly and the passage is only practicable when the swell is not very heavy.

Coast.—From Maraa point the coast trends for 6 miles E. by S. to Popote bay; the appearance of the country changes, the climate becomes moister than the part between point Venus and Maraa point, the trees descend to the foot of the mountains, and in the plain the orange and citron flourish abundantly.

From Papara the foot of the mountains recede from the coast, leaving a plain about half a mile broad and 4½ miles long.

Popote bay.—This bay is formed by a break in the reef about half a mile broad, and some banks extending for 2½ cables to seaward from the eastern reef, enclosing a harbour in which the depth does not exceed 11 fathoms, bottom sand and gravel: it is too much exposed to the south-westerly swell to be a safe anchorage, but is convenient with easterly winds.

The Taharuu river, which is one of the largest in Tahiti flows into this bay from a deep gorge penetrating to the middle of the island.

Reefs.—The barrier reef recommences at Mahaiatea point, the eastern side of Popote bay, and extending for about a mile from the land forms a curve for more than 3 miles to the eastward to Aifa pass. This reef encloses a large basin with depths of from 8 to 16 fathoms, which, although strewn with coral patches offers numerous anchorages which used to be much frequented.

Taevaraa pass, is at the western end of this basin, about a mile from Popote bay; it is broad but has only 13 feet of water in it. Directly exposed to the swell from S.W. it is more of a bar than a pass and the sea almost always breaks across it.

Small vessels might possibly use it, when the easterly winds prevented their getting out of Aifa pass, as they can anchor and make sure that the bar is practicable, but they ought never to attempt to enter under any circumstances.

Aifa pass.—This pass much resembles that of Papiete; it is formed by a break in the exterior reef 2 cables broad, which is obstructed on the western side by a bar which extends for about 2 cables to seaward, leaving an oblique channel about half a cable wide between it and the point of the eastern reef which is steep-to and clear. This pass is often dangerous and with a heavy swell from the southward, which is frequent, the current runs out against the sea, causing heavy breakers right across the entrance when it would be rash to attempt entering.

Directions.—To enter Aifa pass, sailing vessels should make sure that there is a fresh breeze inside the reefs. Steer N.W. ½ N., passing close to the point of the reef on the eastern side, and then alter course to N. ¾ E. Four coral patches will then be left on the port hand, on the northern of which is a small sandy islet. Then pass between two small patches awash which are each marked by a red buoy, 1½ cables apart, lying just to westward of the south point of Mapeti island, which is near the N.W. end of the eastern reef. Then leave a coral patch, whose north point is marked by a black beacon, on the port land. Another coral patch lies 1½ cables S.W. of this patch also marked by a black beacon.

Anchorage may be obtained between the two beacons and the land in from 11 to 16 fathoms, sand, close to the chief house of Mataiea, situated on the banks of a pretty river.

In going out, pass close to the point of the eastern reef and then steer S.E.

The channels which lead between the patches inside the reefs to the westward of Aifa pass, are marked with circular beacons and tripods, painted white, black, and black and white.

Rautirare pass, about 1¼ miles east of Aifa pass, is 2 cables wide, open to the southward, and is perfectly clear and practicable at all times. On the eastern side of the channel near the N.W. corner of the reef is Pururu islet, situated about half a mile inside the outer line of breakers.

Papeuriri bay is inside this pass and extends for about 4¼ cables each way. It is perfectly clear and the depth varies from 8 to 13 fathoms, black sand; lesser depths of 5 fathoms extend at most to three-quarters of a cable from the shore. The coast is lined with a beautiful sandy beach, and the important river of Vairaharaha discharges itself opposite the pass.

Anchorage, which is generally safe, may be obtained anywhere in the bay, and especially near Pururu islet. However, the pass is so wide that a vessel would not be sheltered with strong winds and a heavy sea from the southward, and she would have to enter one of the channels which communicate with Aifa pass on the west and Temarauri pass on the east.

Otutara channel, which connects the anchorage opposite Aifa pass with Papeuriri bay, is a narrow beaconed channel about 8¼ cables long and a quarter of a cable wide in the narrowest part, having a depth of 8 to 11 fathoms, with the exception of two shoal patches on which there are only 3¾ and 3¼ fathoms.*

Coast.—From Otiaroa point, which is opposite Pururu islet, the coast bends suddenly to the northward for about half a mile, and then trends E. by N. ½ N. for 3 miles to Oneroa point which is situated opposite Hotumatuu pass. The hills come close to the sea coast and then run back again at Papeari, forming a plain more than half a mile broad to Oneroa point. The mountains, wooded to the base, are cut into a series of gorges, parallel to one another, from which several rivers flow.

The outer reef which extends for more than a mile from the land, trends to the eastward for nearly 2 miles from Rautirare pass and then turns suddenly to the N.E. for about 1½ miles to Hotumatuu pass.

Temarauri pass, which is about half a mile westward of Hotumatuu pass, gives access to a series of basins which extend to the westward for about 1½ miles, and communicate by a narrow channel with Papeuriri bay. It is one cable broad and 3 cables long in a N.W. by W. direction; but the eastern reef extends to the S.S.W. right in front of the pass, and forms a bar over which it is generally unwise to pass. The pass thus forms an elbow at its mouth in a north and south direction.

A small reef awash, lies about 2¾ cables inside the entrance, and about half a cable from the eastern reef, leaving a passage about three-quarters of a cable broad between it and the western reef.

On entering this pass steer N.N.W., leaving the point of the western reef about half a cable on the port hand; after rounding this point alter course to N.W. by W., looking out for the isolated reef on the starboard hand.

Papeari harbour, which is situated inside this pass, is about half a mile long and 4 cables broad, and separated from a second basin, called port Ataiti, by a point from the outer reef, which extends to within 2 cables of the shore; this point is prolonged by a bank which only leaves a passage half a cable wide between it and the land; the N.E. point of the bank is marked by a black tripod.

The depths in the harbour vary between 13 and 19 fathoms, sand or mud; and the usual anchorage is in the direction of the pass at 2 to 2¾ cables from the land, opposite the mouth of a small rivulet.

Hotuamatua pass is a break in the outer reef 1½ cables wide. It is more of a cul-de-sac than a pass, as it does not lead into any important basin. However, small vessels can find shelter from the westward at the bottom of the pass, where there is only 9 to 12 feet of water.

Coast.—From Omaroa point the coast takes a sharp turn, and trends S.S.E. for about 2 miles to the isthmus of Taravao; two deep bays blocked with coral breaking its general direction. The mountains, wooded from top to bottom, approach the sea, and fall abruptly to the isthmus, which is only about 100 feet high.

From the isthmus the coast trends parallel to itself for about a mile to Teana point, forming port Phaeton, which is about 2½ cables broad. From Teana point the coast trends S.E. for a mile to Toahutu point, which direction it preserves to the southward.

From the isthmus to Toahutu, the coast is low, wooded, and broken by deep bays blocked with coral. At the entrance to one of these bays, named Mitirapa, is a bridge, lying midway between Teana and Toahutu. The land rises in gentle and uniform slopes to the high and rugged mountains in the centre and south part of the peninsula.

From Toahutu point the hills approach and almost overlook the sea. The first of these hills, named Farei, is a great bare rounded summit, which overlooks Toahutu, and is a good mark from seaward to find the two white pyramids placed at Toahutu as a leading mark into Teputo pass.

From Hotuamatua pass the outer reef trends to the eastward for a mile to Teputo pass, and then turns suddenly to the S.E. by S. and runs in that direction along the coast of the peninsula.

Teputo pass is a break at the angle formed by the outer reef, about 2 cables wide at the entrance. At 2 cables from the entrance the western reef curves to the north-west, and the eastern reef turns sharply to the eastward. Inside, and in front of the gap is a large coral bank of irregular form named Matuhu, which is about 5 cables long from south to north, and marked at its northern extremity by a black-and-white tripod. This bank divides the large gap into two distinct passes, that of Teputo on the east and Matu on the west side; the former is perfectly clear, about 130 yards wide and one cable long; the latter is about 2 cables broad, but has a small bank in the middle which leaves a deep channel about 150 yards wide between it and Matuhu bank, forming a sharp elbow, and, not being marked by beacons, should not be attempted except in cases of necessity.

Beacons.—Two white pyramids in line on a N. 59° E. bearing form the leading mark for Teputo pass; they are placed near the end of Toahutu point, and may be found from seaward a little to the left of Farei hill.

Toahutu basin, which lies just inside the pass, is perfectly safe in the western part, and the reefs on the eastern side are marked by beacons

It affords good anchorage for about half a mile from north to south, and 2½ cables wide, in from 16 to 22 fathoms, sand and mud. With Toahutu point E. by N. ¾ N., and Mitirapa bridge N. by E. ¼ E., there will be swinging room of 1⅓ cables in all directions.

From the north end of Matuhu bank there is a channel 2 cables wide between the shore reefs, and from 8 to 16 fathoms deep, leading to port Phaeton. Halfway between Matahu bank and Teaua point there is a reef on the west side, the eastern point of which is marked by a black beacon. There is also a small patch near Teaua, at which point the channel opens into port Phaeton.

Port Phaeton.—This harbour is more than one mile long from Teaua point to the isthmus of Taravao, the sides are indented by deep bays blocked with coral, but in the middle there is a channel 2 cables wide and quite clear, and affording anchorage anywhere in from 5 to 11 fathoms, with an excellent holding ground of mud.

Near the head of the port is a stone jetty built out to the edge of the reef to facilitate landing.

Reef.—From Teputo pass the outer reef runs in a straight line S.E. by S. for about 5 miles to Ava-iti pass. At 2½ miles from Teputo pass is a break in the reef called Tapueraha pass, and the outer reef lying between the two, which is about half a mile wide, is called Temaino reef.

Tapueraha pass is about 3 cables wide, but the navigable channel is narrowed by a shoal which extends to the southward from the Temaino reef for about 1½ cables, on which there is only from 9 to 12 feet of water, and by a shoal from the south reef on which there is about 3 fathoms, leaving a deep channel about a cable wide between them.

Inside the pass there is a harbour about 8 cables wide, which is safe, and affords anchorage in from 10 to 22 fathoms. The swell enters by the pass and breaks upon the beach.

At 2¾ cables inside the entrance and north of the pass is a small patch with 3¾ fathoms; and another patch upon which there is only 5 feet of water lies about 2¾ cables to the south-east of the entrance.

Between Temaino reef and the shore there is a narrow channel marked with beacons connecting Toahutu basin with this harbour, and another channel 2½ cables wide leads into the large basin to the southward called port Vairao, in which there is deep water, with several reefs marked by beacons, between which anchorage may be obtained almost anywhere.

Coast.—To the southward of port Vairao is a rounded point where the coast turns to the eastward for about 3 cables and then trends S.E. for about 1½ miles to the low point of Arahuhu, close to which is the village of Teahupu, it then continues in the same direction for 1¼ miles to the low point of Fare Mahora, after which it trends E. ½ S. for 5 miles to Fareara point.

The whole of this coast is dominated by high mountains, between which are deep gorges and valleys running towards the centre of the peninsula.

Ava-iti pass.—This is a small pass only about 80 yards wide and 2 cables long, and 13 to 16 feet water at the entrance; it is only practicable in very fine weather and for vessels of small tonnage.

Reefs.—From Ava-iti pass the outer reef curves to the eastward for 2½ miles, past the Ava-ino pass, to Havae pass, on the east side of which it rejoins the shore at Fare Mahora point, leaving only a boat channel along the shore. It then trends E. by S. for about 4 miles at about half a mile from the shore, past the Puuotohe pass as far as Vaiau pass, situated opposite a valley of the same name.

Beyond Vaiau pass it trends E.S.E. for a mile and then turns sharply to the northward to within a cable of the shore, from which it is separated by Tutataroa pass. It thus forms a point beyond which the line of reef continues in a series of coral banks along the coast at about a mile from the shore.

Inside this line of reefs there are some basins of deep water, which are much encumbered however by coral patches, and the passes through the reefs are narrow and often shallow, so that they can only be made use of generally in fine weather.

Ava-ino pass is about 3 cables wide, and only a bar, which ought never to be used by vessels. Boats can only enter when the sea is calm, and have always to be careful of the blind rollers.

Havae pass is near Fare Mahora point and opposite a ridge which separates the valleys of Mahire and Vaiaia.

This pass is straight, deep and clear, one cable wide and 2 cables long, opening out into a small circular basin, where anchorage may be obtained in 13 fathoms, sand, with swinging room of one cable. This basin being open to the pass is not sheltered from the swell from south-westward, and can only be considered a temporary anchorage.

To the north-west of the basin is a channel 60 yards wide and 1½ cables long, leading into a narrow and well-sheltered basin where the holding ground is good; but when anchored in the middle there is only about 130 yards swinging room.

Puuotohe pass, about 1½ miles from the Havae pass is nearly two cables wide, but the eastern side is occupied by a shoal, which only leaves a channel 40 to 50 yards wide, and 3¾ fathoms deep, practicable only in fine weather. The pass is only half a cable long and opens out quickly after the line of breakers is passed.

Vaiau pass, near the south end of the peninsula, lies opposite mount Faretua, a large mountain whose summit 3,189 feet high is well marked. The break in the reef is a cable wide, but a reef awash divides it into two channels, the eastern of which is narrow and winding, and although 4¼ fathoms deep is only practicable for boats in fine weather. The western channel is half a cable wide but has a small coral head, on which is 2¾ fathoms, projecting a short distance to the N.W. of the middle reef. The outer point of the western reef extends for 2 cables to seaward, but is steep-to inside the pass.

Port Vaiau, which lies inside this pass, is about one mile long and 3 cables wide with depths of from 10 to 22 fathoms, mud. Although containing a great number of isolated banks, it affords fair anchorage in 16 fathoms, mud, with 1⅓ cables swinging room, to the S.W. of Maraetiria point, which is low, and formed by the deposits of the Vaiau river.

There are two openings into this port, the passes of Vaiau and Tutataroa, and another channel connects it with the basins to the westward.

Tutataroa pass is situated between the shore and the outer reef, which turns to the northward perpendicularly to the coast about a mile to the eastward of Vaiau pass. It is one cable broad and 4 cables long in a W. by N. direction; the shore reef does not extend to more than half a cable from the beach, but is prolonged at the entrance by a small patch of 6 feet which leaves the deep channel only two-thirds of a cable wide; and there is another patch which projects from the shore reef where the pass opens into port Vaiau. The outer reef is steep-to on the south side of the pass.

Coast.—From Tutataroa pass, the S.E. coast of the Taiarapu peninsula trends to the E.N.E. for 2 miles to Rapae point and then N.N.E. for 2 miles to the Vaiote valley opposite which the reef awash recommences. This part of the coast which is not defended by the barrier reef presents quite a different appearance to that part which is inside the reef; the mountains fall precipitately to the sea forming a line of steep cliffs against which the sea breaks furiously when the fresh breezes from the eastward are blowing.

Banks.—This coast is surrounded by a belt of submerged reefs which extend for 2 or 3 miles to seaward. The heavy waves from the S.W. which strike upon these banks, with the sea raised by the easterly winds, form enormous waves, and the vicinity should be avoided.

Coast.—From Vaiote valley the coast trends to the northward for about 3 miles to the fine valley of Vaitoto, but little information is known about this part.

Reefs.—The reef awash which commences off Vaiote extends along the coast to the northward about a mile from the shore; two wooded islets are situated near the south end of this reef, opposite the valley of Tomotai. A pass lying between the shore and the islets leads to an anchorage opposite this valley.

Tomotai pass.—This is a bad passage which runs in a W. by N. direction, and in entering or leaving, vessels should keep near the northern reef to avoid some sunken rocks. When the islets are on the starboard beam on entering, alter course to the northward to gain the anchorage.

Vaiurua pass is about 2 miles north of Tomotai pass, and leads in in a S.W. direction. Inside is a good harbour which communicates with Vaionifa pass, about 2 miles further north, by a deep channel.

Coast.—From Vaiurua pass the coast trends to the northward for about a mile to Vaitoto point, where a river of the same name flows into the sea from a deep and cliffy gorge which penetrates far into the interior. The point is formed by a plain which projects about 3 cables from the foot of the mountains.

From Vaitoto, the coast which is bounded by a plain which varies from one to two cables in width, trends N.W. for about 3 miles to Tautira point, from whence it turns to the W. by N.

Tautira point, on which is an important village, is a tongue of low wooded land about 3 cables wide extending to the northward for three-quarters of a mile from the foot of the mountains, and is formed by the deposits from the Vaitepiha river which is one of the largest in Tahiti.

Reef.—The outer reef runs along the coast at half a mile from the shore, enclosing channels of deep water inside. From Vaionifa pass it trends to the N.W. in a straight line, rounding Tautira point at 2 cables and ending abruptly to the westward of the point.

Between Vaionifa and Tautira there is a gap about 2 cables wide, in which there is only 9 feet of water.

Vaionifa pass is about one cable wide and 1½ cables long, open to the N.E. The point of the reef on the northern side extends to the westward for about half a cable, but the remainder of the pass is perfectly safe.

In the inside, just opposite the pass, at one cable from the shore there is a small patch on which there is only 3 feet of water.

To enter the pass steer S.W. in mid-channel with mount Roniu showing over the foot of mount Vaionifa.

Between this pass and Tautira there is a large basin, 2 to 3 cables broad and 2½ miles long, which ends in a cul-de-sac at the north end, with the exception of a small boat channel to the village. There are depths of 19 to 37 fathoms, mud, almost everywhere, but at the north end the soundings decrease gradually to 16 and 8 fathoms.

Coast.—From Tautira point the coast trends W. by N. for 5 miles to a short distance beyond the village of Pueu. The general direction is straight, but two low and wooded points called Pihaa and Faraari, project about 2½ cables to seaward; the first at 2 miles from Tautira, and the second about a mile further on. The mountains behind are steep and cliffy from which numerous cascades descend.

The only large break in the mountains is the valley of Haavini which opens between Pihaa and Faraari points. The plain between the foot of the mountains and the sea is very narrow, except at the two points and the entrance to the valley.

Reefs.—The outer reef which ends abruptly westward of Tautira point recommences half a mile further on, forming with the point the bay of Tautira or Cook's anchorage. It then runs parallel to the coast at half a mile from the shore to a short distance beyond Pihaa point, where it is interrupted by the broad pass of Taharoa, to the westward of which it curves round Faraari point at a distance of 3 cables and runs along the shore for a mile beyond this point.

These reefs are separated from the shore by passes and basins of deep water which are called port Pihaa and port Pueu.

Tautira bay, or Cook's anchorage, is formed by Tautira point and reef on the east side, and the outer reef on the west side.

It is half a mile broad, about the same depth, and open to the N.W., affording protection with winds from N.E. through South to W.N.W., but is dangerous with the wind from North to W.N.W. Cook anchored several times in this bay, from which circumstance the name is derived.

The depth in the middle of the entrance is 55 fathoms, diminishing gradually to the shore. The East and S.E. part of the bay is lined with a sandy beach.

The bay is clear, except a small patch of 2 fathoms, lying one cable south of the point of reef on the western side.

The best anchorage is at about 2 cables from the shore in 8½ fathoms, sand, with the extremity of Tautira point bearing N.E. ¾ N.

Port Pihaa is the deep basin, 3 to 4 cables broad and 1½ miles long, which extends between the reef and the shore, from Tautira bay to Pihaa point, with depths of 16 to 19 fathoms, sand and mud, nearly everywhere.

There are two openings into this port, that from the eastward from Tautira bay being a cable wide, but divided by the small 2 fathoms patch; the other from the westward from Taharoa pass is only about 60 yards wide. There are several small patches and reefs, especially near the eastern end, and anchorage is good in all parts which are not encumbered by banks.

Taharoa pass is a large break in the reef, about 4 cables wide, opposite the valley of Haavini. Just within the entrance is a bank about a cable wide, with only 3 to 6 feet water over it; the channel on the east side is about a cable wide, that to the westward 2 cables wide. There are also three other small patches in the bay.

The best mark for entering is to steer S.S.E. ¼ E. for the cascade at Pihaa, which leads through the middle of the eastern chanel. The reef on the eastern side is steep-to.

Port Pueu is situated between the outer reef and the shore near a village of the same name, just to the westward of Faraari point.

From Faraari point the coast trends to the westward for 1½ miles to the low point of Tiitau. The outer reef runs parallel to the shore at about 3 cables distant, for 1½ miles from Taharoa pass and ends abruptly half a mile N.E. of Tiitau point. At 2 cables west of this reef and north of Tiitau point is an isolated patch about 2 cables in diameter, the central part of which is awash.

Between the outer reef and the shore is a deep channel which opens out a little to the westward of Faraari point and forms a basin 2½ cables wide called port Pueu in which the depth varies from 13 to 25 fathoms, sand and mud. Entrance to this port can be effected either from the eastward by Taharoa pass or from the westward.

About three-quarters of a mile to the westward of Faraari point, the outer reef is submerged for about 2 cables, on which there is only about 6 feet of water, and may be mistaken for a pass when the sea is calm.

Coast.—From Tiitau point the coast trends W.S.W. and then W. by N. for 3¾ miles to the isthmus of Taravao, from thence it turns and trends N. ½ W. 6½ miles to the Boudeuse pass, forming a large bay open to the N.E.

The mountains, which are high and steep behind Pueu, descend in a gentle slope to the isthmus; they are generally bounded towards the sea by perpendicular cliffs which overlook a low plain about a cable wide.

On the highest part of the isthmus is a fort which is visible from the sea to the eastward.

To the north of the isthmus the mountains, which are densely wooded, hem the coast closely; they are divided by numerous ravines, of which the most important are the valleys of Papeivi, Vaitoare, and Faone, the first at one mile, the second 1½ miles, and the third at 3 miles from Taravao.

Reefs.—From the isolated bank off Tiitau, the outer reef is nearly altogether submerged, and forms a long chain of banks running in a straight line W. by N. for 3 miles to the deep passage which separates it from the reef off Vaitoare. The breadth is not more than one cable, and the depth varies generally from 9 to 20 feet, though at some places the coral is awash, and at others there are 5 or 6 fathoms forming passes into the basin inside.

Tiitau pass is the channel between the reef and isolated patch before mentioned, about 2 cables wide, which enables a vessel to get into Taravao bay from the eastward.

Taravao bay is the large expanse of water between the outer reef and the shore, nearly a mile broad and more than 3 miles long. The general depth is from 21 to 27 fathoms, shoaling near the shore, and the bottom which is mud affords good holding ground.

The bay is open to the N.E. and exposed to winds between north and east, as the banks only afford an insufficient shelter from the sea which breaks upon the beach.

Motu Nono is a wooded islet in the bay inside the line of shoals, half a mile from the shore and 1¾ miles E. ¾ N. of Taravao fort. It is surrounded by a shoal which extends nearly a cable from the beach.

Banks.—Two isolated patches lie W. by N. ½ N. from Motu Nono, one at 3 cables with 2 fathoms and the other at one mile with 2½ fathoms. Another patch with 6 feet lies 4 cables east of the islet.

Motu Nono pass, opposite the islet of the same name, is a depression in the line of reefs where there is 4 to 5 fathoms of water. For entering by this pass steer S. by W. ¼ W. for the middle of the islet, and after passing the line of breakers alter course so as to pass at more than a cable on either side of the islet.

Pass.—By steering S.W. by W. for Taravao fort, the line of submerged reefs will be crossed at a place where there is a depth of about 5 fathoms. This line passes within one cable of the 2½ fathom patch lying one mile W. by N. ½ N. of Motu Nono; in order to give this patch a wider berth, alter course to port after crossing the line of breakers, or when the islet bears S.E. by E. ½ E.

Papeivi pass, which lies between the extremity of the submerged reefs and the south point of the reef off Vaitoare, is about 1½ cables wide, with a least depth of 6 fathoms.

To enter the pass steer S.W. by S. for Taravao fort, which will lead half a cable from the reef off Vaitoare.

Port Vaitoare.—From Papeivi pass the reef awash trends to the northward parallel to the coast at 4 cables from the shore, for a distance of 1⅓ miles, where it is separated by a narrow and deep channel, half a cable wide, from a bank named Paratahi, which extends 3 cables to the northward to Faone pass, which is 2 cables broad, opposite the valley of the same name.

The deep basin enclosed between the reefs and the shore, where the depth varies from 19 to 27 fathoms, sand and mud, is called port Vaitoare. It is clear except two small patches which are near the south end, and the shore reef does not extend to more than half a cable from the beach. Anchorage may be obtained anywhere.

Coast.—Between Faone valley and Hitiaa the mountains are very steep, broken by numerous valleys, and in some places towering over the sea.

A short distance to the northward of the Faone valley is a church with a spire, plainly visible from seaward.

Reefs.—From Faone pass the outer reef trends to the northward at 5 cables from the shore for about three-quarters of a mile until opposite the village of Utuofai. Between the reef and the shore is an anchorage where protection may be obtained from the eastward, but the swell rolls in from N.N.E. or S.E. The depth is generally 10 to 16 fathoms, sand and mud, gradually decreasing towards the shore, which is lined by a sandy beach.

There are several patches, some of which are nearly awash, so that caution is needed when using the anchorage, the best position for which is with the church bearing S.S.W. ¼ W.; and Teruafaroa point S. by E. ¼ E. in 14 fathoms, sand and mud.

To the northward of this reef is a broad gap for about a mile, opposite the valley of Papeiha, when the outer reef commences again opposite Faatautia and extends to the northward in a slight curve, at about 4 cables from the shore, for 2 miles to the Boudeuse pass opposite Hitiaa.

Inside this reef is a long channel of deep water about 2 miles in length and 2 cables broad, gradually narrowing near the northern end, with depths varying from 13 to 22 fathoms, mud. The entrance in from the southward is 1½ cables wide, and anchorage may be obtained in the middle of the channel in about 22 fathoms.

Coast.—From Hitiaa the coast trends N.W. by N. for rather more than a mile to Mata-orio point, which is low and woody, to the northward of which is the small bay of Taipahia; from thence it curves to the N.W. for a mile to Putaiamo point.

The plain near the coast is from one to 3 cables wide to Mata-orio point, beyond which the mountains come close down to the coast. At half a mile N.W. of Putaiamo point is the village and church of Mahaena, where two rivers discharge themselves into the sea near a sandy beach.

Reefs.—To the northward of Hitiaa point the outer reef is broken by Boudeuse pass, beyond which it trends to the northward for about half a mile, with two low and wooded islets at its extremities, Oputotara at the southern and Variararu at the northern end.

To the northward of Variararu the reef is submerged for half a mile, forming a pass, in the deepest part of which there is a channel of 3¼ fathoms, practicable only in fine weather. The reef then comes to the surface and trends N.W. by N for about a mile to abreast of Putaiamo point, after which it extends for half a mile with depths of 2 to 3 fathoms over it to Mahaena pass. There are two low, wooded islets on this reef, one named Motu Puuru lying 5 cables N.E. ¾ N. of Mata-orio point, and the other named Nansouty situated half a mile further north, 7 cables east of Putaiamo point.

From hence to point Venus the outer reef does not again come to the surface, but continues along the coast as a chain of banks, the first of which is called Fana or Artémise bank.

Boudeuse pass, lies opposite Hitiaa, between the reef off that point and Oputotara islet. It is about 4 cables wide, but narrowed on the north side by a shoal which extends for about 2 cables from the islet; in the middle of the pass is a patch on which there is only 4¾ fathoms of water.

Inside the pass, and between the islets and the shore is an anchorage called Bougainville harbour, named after the celebrated navigator who anchored here in the *Boudeuse* frigate in 1776. The anchorage is fairly sheltered, but the bottom is strewn with coral heads among which Bougainville lost several anchors; caution is also necessary, as there are several patches and reefs scattered about.

Mahaena pass is an opening about half a mile wide between the submerged reef which extends 6 cables N.N.W. of Nansouty islet and Artémise bank.

Anchorage may be obtained in 19 to 25 fathoms, sand and mud, between the islets of Nansouty and Motu Puuru and the shore, with shelter from seaward by the reef which joins the islets; but it is open to the N.W. and insufficiently sheltered in that direction by the submerged reefs extending to the northward. The swinging room is limited and the swell sets in with winds from seaward.

There are several patches and reefs which must be avoided when picking up an anchorage here.

Coast.—From Mahaena the coast trends N.W. by N. for a mile to the low point of Faaru, then it curves to the W. by N. for 2½ miles to Onoheha, beyond which it trends N.W. for 1½ miles to Faarumai valley. The mountains come close to the coast, and the only important valley is that of Onoheha, which penetrates far into the island and having at the head a remarkable mountain named Matotea.

Reefs.—From Mahaena the reefs are altogether submerged, and form to seaward of the coast a series of dangerous banks, the depth of water upon which is generally 3 fathoms and less, and extending at times to more than a mile from the shore.

Between the banks and the shore are large open roadsteads in which the depth does not usually exceed 27 fathoms, sand. Anchorage may be obtained, but the banks are too much submerged to afford shelter from the sea, and the position is in a part of the island fully exposed to the prevailing wind.

Several broad passes give access into these basins, and in fine weather small vessels can pass over the banks when sure of the marks; but during the bad season when the winds blow from seaward, the sea is very heavy upon all the banks, especially the Artémise bank.

Fana or Artémise bank extends in a N.W. by N. direction from Mahaena pass for 2 miles, and then turns sharply to the west for 2 miles to Onoheha pass; the soundings vary from 2 to 5 fathoms, except in a sort of pass about a mile east of Onoheha pass.

The east side of Motu Puuru in line with the west side of Nansouty islet, bearing S.S.E. ¾ E., leads clear of the east side of this bank. The light on point Venus is visible clear of Papenu point bearing W. ½ N. when on the northern edge of the bank.

Onoheha pass is a channel about 4 cables wide opposite the valley of the same name, with banks covered with 2½ and 5 fathoms on either side. Mount Matotea a little open to the right of the hills forming the east side of the valley leads through the pass at one cable from the reef on the east side.

Coast.—From Faarumai valley the coast trends W.N.W. for 2½ miles to the low point of Papenu, which extends for 2 cables from the foot of the mountains; the mountains are steep to the coast for one mile to Utu Turoa point, and then recede, forming the valley of Papenu, at the entrance to which is a plain 2 cables broad.

Beyond Papenu point the coast trends to the westward for nearly 4 miles to point Venus. At 1½ miles from Papenu the sandy beach is interrupted by a hill named Tapahi, the sea face of which is a perpendicular cliff; on the top of the hill is an old blockhouse.

Faarumai pass, about 2 cables wide, is situated opposite the valley of the same name, and about a mile from Onoheha pass. Inside the entrance and 2½ cables from the shore is a bank on which there is only 2¾ fathoms.

Papenu pass, at 2 miles N.W. of Faarumai pass is 4 cables wide and about 1½ miles from the shore. A S.S.W. ¼ W. course for the foot of the mountain forming the entrance on the west side of the valley leads through the pass.

Maha Honu pass, 1½ miles east of point Venus, is one cable wide, and a S.E. ¼ S. course for the blockhouse on Tapahi hill leads through the pass.

Port Motu Au.—At nearly a mile east of the lighthouse on point Venus is a large wooded islet called Motu Au, lying about 300 yards from the shore, from which it is separated by a channel with 5½ fathoms water. This islet is surrounded by a reef awash which extends to the northward for 3¾ cables from the coast.

Between this reef and the east part of the reef off point Venus, a pass 2¾ cables wide and open to the northward, gives access to a bay, at the bottom of which a small river discharges itself.

Anchorage may be obtained in depths up to 32 fathoms, sand, on a gentle slope. With easterly winds there is tolerable anchorage near the reef of Motu Au, but it becomes dangerous when the winds are strong from N.E. to N.W.

With N.W. to S.W. winds, which, when they are fresh, render Matavai bay untenable and the pass at Papiete dangerous, anchorage may be obtained here with temporary shelter.

MUREA or EIMEO ISLAND lies westward of Tahiti, the channel separating them being 7½ miles wide. Murea was discovered by Captain Wallis in 1767; it has, if possible, a more broken outline than Tahiti and is more thrown up into separate peaks; in places the mountains rise precipitously from the water to a height of 2,500 feet, and the highest peak named mount Tohivea in the southern part of the island is 3,975 feet high.

The island is almost an equilateral triangle in shape, each side being about 9 miles in length and surrounded by a barrier reef through which are several passages to the basins between it and the shore. On the north side are two deep indentations called Papetoai and Cook bays which afford snug and safe anchorages. At the north-east point is a small lagoon or lake in which are abundance of excellent fish. In 1881, the population numbered 1,428.

Coast.—Teavivo point, the eastern extremity of the island is low and wooded and extends for more than half a mile from the foot of the mountains; the coast then trends N.W. by W. for nearly 2 miles to Tiaia point where it turns to the W.S.W. for 2½ miles to the entrance of Cook bay.

A barrier reef extends along this coast at about half a mile from the shore, with two small passes into the enclosed basins.

Cook or Paopao bay is a narrow indentation in the land, perpendicular to the coast, half a mile wide and nearly 1½ miles long. The depth varies from 10 to 18 fathoms, mud, shoaling gradually towards the head of the bay where there is a small river.*

Avaroa pass, which is the channel through the reefs into this bay, is 1½ cables wide and 4 cables long in a S.E. direction, the sides are steep-to and the pass is safe in all weathers.

The shore reef does not extend to more than half a cable from the beach except off Nuupure point, the western entrance point, where it projects for about a cable. The only danger is a small patch with 3 feet on it which lies 1½ cables from the east shore halfway up the bay.

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* *See* plan on Admiralty chart No. 1,382.

Good anchorage may be obtained almost everywhere, except in one or two places where the bottom is coral.

Papetoaï or Teriu bay lies on the north side of the island about 1½ miles west of Cook bay and penetrates 2 miles in a southerly direction; it is enclosed by precipitous sides rising in places to a height of over 2,000 feet. At the head of the bay is an extensive plain employed for the cultivation of sugar where there is a factory chimney and a large white house close to the beach.*

This harbour has the advantage of being easy of ingress or egress during the ordinary trade wind, several streams fall into it and the one at the head was found navigable for boats for a distance of one quarter of a mile, where the water was quite fresh. In 1883 the mouth of this stream had shoaled up, so that boats are unable to get very close.†

The entrance to the harbour between the reefs is 2½ cables wide and clear of dangers with the exception of a 2 fathom patch lying well inside the eastern reef.

To enter the bay, steer S.S.E. ¼ E. for the white house, which will lead through the pass and up to the head of the bay.

Anchorage may be obtained near the head of the bay in from 10 to 16 fathoms, mud; and landing can be effected in the small cove on the west side, opposite the village of Orufara, or on the beach at the head of the bay, but the swell sometimes rolls in at the latter place.

Coast.—From Papetoaï bay the coast trends to the westward for 2½ miles to the N.W. point, off which there are two wooded islets, and is fronted by the usual barrier reef extending for 3 cables from the shore. There is a pass through this reef opposite Tehau point, with 5½ fathoms of water and half a cable wide which leads into the interior basin.

From the N.W. point the coast trends in a general direction of S.E. for 8 miles to Paroa point, the southern extremity of the island. The barrier reef extends about half a mile from the shore and is broken by four passes which give access for boats to the basins inside.

From Paroa point the coast trends E. by N. for rather more than a mile to Nuupere point, which is low, from whence to the east point of the island the general direction is N.N.E. for 6½ miles, with several small bays backed by high and rugged mountains.

The barrier reef extends for about half a mile from the shore through which there are three passes to the basins and channels within the reef.

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* *See* plan on Admiralty chart No. 1,382.

† Commander R. H. Thornton, H.M.S *Kingfisher*, 1883.

Teruaupu pass lies about 1¼ miles to the north of Nuupere point; it is deep and 1½ cables broad, leading into a basin in which there is deep water.

Tupapaurau pass lies 1¼ miles further north, and is 2 cables broad, but has only a depth of 3¼ fathoms in the deepest part. Just to the northward of the pass is the small islet of Motu Ahi.

Vaiere pass which is nearly 2 miles south of the east point is one cable broad and 2 cables long; the sides are steep and the water deep. On the southern side of the pass is the small islet of Motu Pehue which is low and bare.

Inside this pass there is a wide and deep basin which is perfectly protected from the sea and affords anchorage in from 19 to 27 fathoms, mud.

CHANNEL between MUREA and TAHITI. — The channel east of Murea, or Eimeo, should never be used but with steady winds from north-east or south-west, as these are the only winds that blow through the channel; when there is a fresh breeze from the eastward to the northward of Tahiti it is calm in the channel.

The north-west coast of Tahiti should not be approached, as the westerly current striking against Murea is turned back towards that part of Tahiti, and sets directly upon the coast.

At times, when there is a meeting of easterly and westerly winds in the Murea channel, a heavy sea is raised, having the appearance of an unbroken line of breakers; this is dangerous for boats, especially off the eastern point of Murea island, against which the current sets. Under all circumstances this point should be given a wide berth. Vessels have remained becalmed in this channel for days whilst a fresh breeze prevailed to seaward.

Steam-vessels from the south-west using the Murea channel should after passing the southern point of Murea, make the light on point Venus before keeping to the eastward.

TETIAROA is a group of small, low islets about 6 miles in length, on which there are many cocoa-nut trees, enclosed by a reef about 30 miles in circuit, lying 27 miles northward of Tahiti, the south-east point of which is in lat. 17° 2″ S., long. 149° 32″ W. There is no entrance to the lagoon except for small canoes.

TAPAMANU or SAUNDERS ISLAND, 37 miles W. by S. of Murea, was discovered in 1767 by Captain Wallis; the greatest length from east to west is about 6 miles. In the centre of the island is a mountain with a double peak, but the greater part has a fertile appearance and the lower ground abounds with cocoanut trees. At a distance the island has much the appearace of a ship under sail.

HUAHEINE is the easternmost island of the leeward group which was named the Society islands by Cook, who discovered it in July 1769. It is about 20 miles in circumference and divided into two peninsulas, named respectively Huaheine-Nui and Huaheine-Iti, the isthmus connecting them is overflowed at high water and forms a boat passage.

This island is surrounded by a reef which, on the west, south, and S.E. sides, is awash and dotted with several islets.

With south-easterly winds the land is generally covered with clouds and hidden by rain squalls, especially during the night, when it would not be prudent to approach the island. In thick weather it is better to make the north point of the island.

There is a narrow strip of fertile land near the shore; the hills indicate volcanic action and are in places cultivated.

The products are similar to those of Tahiti, but come earlier to perfection.

The population number about 1,100, most of whom are Protestants.

Owharre harbour is situated at the north-west end of the island: the principal entrance is just to the westward of the north point, and there is also another entrance further to the southward, marked by a small wooded cay. The name of the settlement is Fari.*

There are two small islets on the reef between the north and south channels; one near the N.W. end, and the other on the southern part. A rock is reported to exist in the south channel.

The north channel is more than a cable wide at the entrance, where there is a bar about a cable across with 4¼ fathoms of water, which deepens to 10 and 20 fathoms inside.

Anchorage may be obtained in 10 to 16 fathoms, mud, opposite the village. Large vessels should moor head and stern.

A native pilot can be obtained if desired; if no pilot is used, half pilotage to be paid, according to port regulations.†

The king's house is in lat. 16° 42′ 31″ S., long. 151° 1′ 30″ W.

RAIATEA.—This island lies 20 miles westward of Huaheine, it is about 40 miles in circumference, of a mountainous character, covered with vegetation and well watered; the highest peak, in the middle of the island, is 3,390 feet high.

At a distance of from 1½ to 2 miles from the shore the island is encircled by a coral reef, which also includes the adjacent island of Tahaa. There are several islets situated on the reef, and between the reef and mainland there are several excellent anchorages.

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* *See* plan on chart No. 526.

† Berlin Annalen der Hydrographie, Heft 1 of 1879.

Government.—The two islands of Raiatea and Tahaa form a state, which is governed by a queen, assisted by 12 district chiefs; eight for Raiatea and four for Tahaa. The population numbered 1,200 in 1880.

Commerce.—The principal articles of export are cotton, which is pressed into bales at a factory near Teavarua, and copra.

Currents and tides.—The currents near these islands generally set to the N.W. with a velocity of 15 to 20 miles a day; but though their strength is variable, they rarely set to the eastward. Inside the reefs the tidal streams are felt, the ebb generally stronger than the flood. The rise and fall of the tide does not exceed one foot. The time of high and low water, and the direction of the tidal streams are much affected by the state of the sea, which when heavy runs over the reefs in large volumes.*

Téavarua or Uturoa harbour, on the east side of Raiatea, is one of the best anchorages; the two principal entrances are situated on either side of the southernmost of two islets, named Taoru. Caution is necessary on entering, as the tide sets right across the channel at times. The flood sets to the N.W. and the ebb to the S.E. The depth of water inside the reef is from 18 to 24 fathoms, and the holding ground is good. Thisbé anchorage is considered the best, and the channel up to it is clear of dangers.†

The German Commercial Society of Oceania possess a factory which is situated about a mile S.E. of Regent point, near Tonoi point; the building is painted white and has a flagstaff erected near it.

Regent point is in lat. 16° 43′ 44″ S., long. 151° 26′ 00″ W.

Buoys.—Two buoys belonging to the Commercial Society are moored opposite their establishment.

Water.—The best watering place is in a small bay S.W. of Taoru island, about 1½ miles from the anchorage. Small craft can go alongside a factory, situated at the head of the bay; from whence the water can be drawn with about 160 feet of hose.*

Supplies.—Fresh meat, fish, and vegetables can be obtained.

Passage.—There is a passage out of Uturoa harbour to the north-westward, inside the reefs, round to Ohamaneno and thence to sea. In 1873 H.M.S. *Cameleon* made use of this channel, with the aid of a native pilot; the least water obtained was 8 fathoms, and that only once. The passage through the reef to the westward is opposite a Mr. Hunter's plantation, having an island with cocoanut trees and brushwood on the right, and a small low sandy islet on the left. The pilot appeared to steer by eye chiefly, but had leading marks at times. By using this passage, going to the westward, much distance and time is saved. This channel is not to be recommended unless a local pilot is on board.

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* Paris Notice Hydrographique, No. 20 of 1884.

† *See* plan on chart, No. 526.

There are several other harbours in the island, of which Ohamaneno on the north-west side is favourably reported on.*

Ohamaneno harbour.—The entrance to this harbour between two sand islands is about 2½ cables wide, and the anchoring depth 28 fathoms, the bottom soft mud. Fresh water may be obtained.

The Pass of Tahaa is situated between the central bank between Raiatea and Tahaa, and the great eastern reef, and enables large vessels to proceed from Teavarua to Tahaa. It is 1½ cables wide at the narrowest part, and presents no difficulties if there is a beacon, or other mark, at the extreme point of the great reef; without some such mark it is not advisable to use the pass unless the banks are clearly visible. In 1883 the beacon consisted of a heap of coral about 5 feet high.†

TAHAA lies about 2 miles northward of Raiatea, and is situated within the same reef, it is about half the size of Raiatea, and not so fertile. The highest peak is 1,968 feet high.

Small islands surround it, the passages between which are encumbered with reefs.

There are two passes through the surrounding reef into the enclosed basins, that of Toahotu on the eastern side, and Paipai pass on the south-west side of the island.

Toahotu pass, 1½ cables broad, is deep and clear of dangers, and may be recognised by the two islets, Mahea and Toahotu, on the reefs on either side.

Inside and nearly opposite this pass is Ohamene bay, where good anchorage may be obtained in from 16 to 25 fathoms.

Tahaa, the principal village, is situated on the south-east point of the island about 2 miles south of Ohamene bay, and good anchorage may be obtained off it in from 16 to 22 fathoms, mud, good holding ground.

The best anchorage is in the direction of the prolongation of the pier with Toamaro point in line with Fatu Fatu, a low rocky islet to the southward of the village. Nearer Fatu-Fatu the holding ground is not so good.†

The village may be recognised by a church and flagstaff.

Paipai pass on the south-west side of the island is 1½ cables broad and half a mile long in a N. by E. direction, and is deep and clear of dangers. Anchorage may be obtained inside the pass in Hurepiti bay in from 20 to 25 fathoms.

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* Commander H. A. Mainwaring, H.M.S. *Cameleon*, 1873.

† Paris Notice Hydrographique, No. 20 of 1884.

BOLABOLA or BORABORA lies about 7 miles north-west of Tahaa. The reef surrounding the island is covered with islets, much larger than those on the reef surrounding Raiatea and Tahaa, but do not extend more than 1½ miles from the shore, except on the S.W. side, where they project for nearly 3½ miles, forming a dangerous spit, which breaks heavily.

Bolabola is distinguished by a very lofty double peaked mountain in the centre, and is generally more craggy than the rest of the Society islands. The eastern side has a barren appearance, the western is more fertile, a low plain which surrounds the whole, together with the islands on the reef are productive and populous.

Otea-Vanua harbour, situated on the south-west side, is well sheltered and commodious, and affords anchorage in 20 fathoms.*

The church is in lat. 16° 30′ S., long. 151° 42′ W.

The entrance through the reef is 2 cables wide and steep-to on either side.

For entering bring mount Paia to bear E. by S. and steer in on that course, which will lead through in mid-channel, until near Maclean point, when alter course for McEvers point, and anchor as convenient off the village.

A shoal extends for 4 cables, off the N.E. end of Marion island, in the direction of Maclean point, which therefore renders it necessary to keep nearer the north shore, which may be approached with safety to about one cable. The edges of the reefs are clearly visible, but with strong N.W. winds the sea breaks right across the entrance, rendering it difficult to distinguish the channel; and at such times it is unadvisable to enter without a pilot or good local knowledge.

Pilots may be obtained if desired; they bring a copy of the port regulations with them.

TUBAI or MOTU-ITI consists of several small and low islands connected by a reef, situated about 13 miles northward of Bolabola. Turtle are said to abound here, and the island is much resorted to by the natives of the neighbouring islands for fishing purposes.

The north point of the reef is in lat. 16° 11′ S., long. 151° 45′ W.

MARUA or MAUPITI lies 23 miles westward of Bolabola, it is a small and comparatively elevated island, about 6 miles in circumference, and the highest point is nearly 800 feet above the sea.

Marua is surrounded by a barrier reef, at a distance of about 3 miles, which encloses numerous small islets covered with cocoanut trees.

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* *See* plan on sheet No. 526.

The entrance to the lagoon formed by the reefs which surround the island, is between two small low islets, covered with trees, which bear S.S.E. from a very remarkable perpendicular rocky bluff, 700 feet high, resembling the ruins of a gigantic castle, on the south side of the island. The channel between the islets is narrow and winding, and at first sight the sea seems to break right across the entrance ; but when about half a mile from the reef, and by bringing the west extreme of the eastern islet shut in to the northward of the east extreme of the western islet, the passage between the reefs will be seen. Care is necessary on account of rollers and strong currents at the entrance.*

In February 1884 the French war-vessel *Volage*, 164 feet in length, entered the lagoon under unfavourable circumstances of weather and sea. The wind was fresh from E.N.E. and a heavy easterly swell. The entrance seemed quite barred until bearing N. ¾ E., when a narrow strip of broken water was distinguished, which had the appearance of deep water, between two banks of foam. The most difficult part of the channel is at the entrance, where it is narrowest, and the current so strong that whirlpools and eddies are formed, which require great care in navigating, and therefore a good speed should be preserved. The channel through the reef runs first N. ¾ E., until west of the southern part of Motu-Té-Iti-Ahé, when it turns to the N. by W. The current always runs out. The *Volage* anchored with the following bearings :—S.E. point of Motu-Té-Iti-Ahé, South ; north point of Motu-Té-Apaha S.E. by S. ¾ S.†

The centre of the island is in lat. 16° 26′ S., long. 152° 8′ W.

MOPELIA (MOPIHÁ) or HOWE ISLANDS, are reported by Captain Scheibner of the German Navy, commanding the barque *Unkel Breasig*, 1875, to lie in latitude 16° 52′ S., longitude 154° 0′ W. (approximate).

These islands are situated on a reef, through which there is no entrance, 10 miles long north and south, and 4 miles broad.

They are frequented by fishermen for the purpose of catching turtle.

SCILLY ISLANDS are a group of small low islands reported by Captain Scheibner to lie in latitude 16° 31′ S., longitude 154° 43′ W. (approximate).‡

These islands lie on a circular reef 6 or 7 miles in diameter, and into which there is no passage.

They are inhabited.

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* Navigating Lieutenant G. D. Lee, H.M.S. *Turquoise*, 1880.

† Paris Notice Hydrographique, No. 19 of 1884.

‡ Berlin, Annalen der Hydrographie, Heft V. of 1876.

Current.—Between Mopihá and Scilly islands the *Unkel Brcasig* experienced a current of 11 miles in 24 hours to windward, the wind at the time being N.N.E. force 7 to 8.

BELLINGSHAUSEN ISLAND is a low coral uninhabited island, of triangular form and covered with vegetation, in lat. 15° 48′ S., long. 154° 25′ W. The reef is steep to all round, and has a number of large boulders on it. About a dozen cocoa-nut trees show conspicuously above the others. There is no opening into the lagoon but the tide flows into it over the reef.

Landing may be effected in fine weather on the W.N.W. side.

CHAPTER III.

EASTER ISLAND.—SALA-Y-GOMEZ ISLAND.—PAUMOTU OR LOW ARCHIPELAGO.

VARIATION IN 1885.

Easter island	11° 32′ E.	Anaa islands	7° 40′ E.
Manga Reva	8° 30′ E.	Disappointment islands	6° 50′ E.

EASTER ISLAND.

EASTER ISLAND or RAPA NUI, was discovered by Roggewein on Easter Sunday 1721. Cook and La Perouse both visited the island, which was subsequently surveyed by Captain Beechey, H.M.S. *Blossom*, in 1825. The visits of Commodore R. A. Powell, H.M.S. *Topaze*, in 1868, and Commander Bouverie F. Clark, H.M.S. *Sappho*, in 1882, have furnished us with more complete particulars, from which most of the following remarks have been derived.*

This island is of much interest on account of the wonderful images sculptured out of the lava by the former inhabitants; and being in such an isolated position, 2,030 miles from the coast of Chile and 1,500 from the nearest inhabited island, except Pitcairn island, the problem as to how it became inhabited has not yet been solved. Until the visit of the *Sappho*, it was generally supposed from the traditions of the natives that their ancestors had originally come in a large canoe from Rapa island, which is 1,900 miles to the *westward*, and therefore right against the usual trade wind; but Mr. Alexander Salmon, the agent for the Maison Brander of Tahiti, who speaks the native language fluently, was able to furnish Commander Clark with more reliable information than was probably obtained previously. The result of Mr. Salmon's repeated talks with the natives on the subject of their first arrival on the island, was to find that they all said they originally came from the *East* in two canoes provisioned with yams, taro, and sweet potatoes. The king (by name "Hotu-metua" or the "Prolific Father") in one canoe, and the queen in the other. On making the island they separated, passing round in opposite directions and meeting again at Anakena on the north side, where they landed, and settled on Mount Topaze, the native name of which is Hotu-iti. They there built the stone houses, the remains of which still exist, and made the statues with which the hill is covered; but the first statue was not made until some fifty years after they landed. The original native name for the island was Te-pito-fenua; *i.e.*, the land in the middle of the sea.

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* *See* Admiralty plan of Easter island on chart No.1386.

In 1863, some Peruvian vessels arrived off the island, and carried a number of the inhabitants away to work on their guano islands; in the following year some Roman Catholic missionaries settled in the island to protect and civilize the remainder, who only numbered about 1,500, and have since been slowly decreasing, so that when the *Topaze* visited the island in 1867 only 900 remained.

In 1878, the Maison Brander, an English firm at Tahiti, who had previously been trading to the island for some years, and had removed about 500 of the inhabitants to work on their sugar plantations at Tahiti, purchased the property of the missionaries on Easter island, who then went with about 300 of the natives to the Gambier archipelago; so that at the time of the *Sappho's* visit there were only about 150 inhabitants left.

The natives somewhat resemble the Marquesans, being of a light complexion, and considered by some people to be a handsome race. There is no trace left now of the missionaries' work, the few remaining inhabitants having no religion at all; they are expert thieves, very revengeful, and never forget or forgive a blow, although generally good-tempered. They are divided into several small clans, amongst which strength or personal courage is the only claim to superiority, and their chief quarrels arise over the efforts of each clan to secure the first eggs of the "wide-awake" every year from Needle rock, to which they attach a superstitious value.

A large grazing farm has been established by the Maison Brander, who have bought up the greater part of the island, and in 1882 there were about 10,000 sheep and 400 head of cattle on the island; the flocks increase very rapidly as there are two, and sometimes three, lambing seasons in the year. Enormous numbers of poultry breed on the island, and are in a semi-wild state, but all owned by the natives.

The great stone busts or images which are scattered over the island in great numbers are most remarkable; they vary in height from 5 to 37 feet, but are usually 15 to 18 feet high. They are all cut out of a gray compact lava found in the crater of Hotu-iti, at the east end of the island, where there are still many in an unfinished state. Their shape is the human trunk, terminating at the hips, the arms close to the sides, the hands sculptured in low relief and clasping the hips. The head is flat, and the top of the forehead cut off level, so as to allow the crown, which is made of red tuff found in the Te Rano Kao crater, to be put on. The face is square, massive, and sternly disdainful in expression, the aspect always upwards.

Easter island is volcanic, and has numerous extinct craters rising from different parts of the island, none of which have been active for a long time.

The island is triangular in shape, and about 29 miles in circumference; from the south-west point to cape Roggewein (the south-east extreme) is 12 miles; from thence to North cape 9 miles, and from North cape to the south-west point, 8 miles. The highest part is a crater near North cape, called La Perouse mountain or Rana Hana Kana, which is 1,767 feet high. All the hills are smooth and rounded, and there are no trees on the island.

The coast is rocky, and there are only two or three sandy beaches in all its extent. On the north and south sides the land is high and precipitous, allowing of no landing except at a snug little cove on the north shore, called Anakena.

Near the south-west cape is the largest crater, called Te Rano Kao, 1,327 feet high, and descending inside for 600 or 700 feet, where it is 2½ miles in circumference. At the bottom of this crater is a small lake, covered with a thick carpet of decayed and matted vegetable matter, which in most places is strong enough to bear the weight of a man, and even cattle have crossed occasionally. Mr. Salmon states that he has failed to obtain bottom in this lake with 50 fathoms of line.

Mount Topaze or Hotu-iti is another isolated extinct crater about 680 feet high, situated in the south-east part of the island; and from the gray lava of which its sides are composed all the images have been made.

Off the south-west point at distances of 2 and 4 cables respectively are two rocks, Mutu Raukau or Needle rock and Mutu Nui or Flat rock, with deep water between them and the main island. The *Sappho* made use of the inner passage on her way to Cook bay, and reported them both clear of dangers.

Cook bay or Hanga Roa on the west coast, is a small bay, about one mile wide between Cook point and Punta Roa, and affords good anchorage from October to April, the season of the trades; but during the remainder of the year is often a lee shore. H.M.S. *Sappho* anchored in 14 fathoms, with the village bearing E. by S., and Punta Roa S. by W.; but vessels are recommended to anchor outside the 16 fathom line, as inside that depth the bottom is extremely hard, and nearer the shore there are large boulders.*

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* *See* plan of Cook bay on sheet No. 1386.

The landing in this bay is not very good, the water being shallow inshore with a rocky bottom, but it is quite safe in fine weather.

The observation place at the mission house in Cook bay is in lat. 27° 10′ S., long. 109° 26′ W.

Hanga Piko, the bay next to the southward of Cook bay, affords excellent landing; but the channel in between the rocks is rather narrow, and with any swell on, the breakers are rather alarming; however it never breaks right across, except in a gale, and the passage has been improved by the officers of the *Sappho*, who blew up a rock which jutted into the channel on the south side.

Supplies.—Beef, mutton, and poultry can be easily obtained; the sheep, averaging 60 lbs. in weight, costing 3 dollars each. Vegetables at present are rather scarce at short notice, but as yams, sweet potatoes, bananas and plantains grow in abundance, they can be obtained in time.

Water is scarce, except at the bottoms of the craters, and at a well of excellent water on the hill at the back of the mission house in Cook bay, called Puna-Pau or "the unfailing well."

It is a curious fact, that whenever there is a heavy swell on the west side of the island, the water rises in the well, although remaining perfectly fresh.

Winds.—From October to April, the S.E. trade is constant at Easter sland, blowing strong at the commencement and termination. There are occasional showers during the trade. From April to October the weather is variable, westerly winds prevailing when there is a good deal of rain.

Thunder and lightning are apparently unknown.

Tides.—It is high water at full and change at 0hrs. 39m., rise of tide about 6 feet.

SALA-Y-GOMEZ ISLAND.

SALA-Y-GOMEZ was discovered in 1793 by the Spanish commander of that name, and was again visited by the Spaniards in 1805.*

The island is of less extent than was formerly supposed, being scarcely more than a heap of stones, less than half a mile long, in a N.W. and S.E. direction and a fifth of a mile wide, and in a gale of wind would hardly be distinguishable amidst the spray; the highest part at the S.E. end is 98 feet high. The rocks, except such parts which the sea birds frequent, are of a dark brown colour.

Some sunken rocks lie off the N.E. and S.E. points.

The N.W. point is in lat. 26° 27′ 41″ S., long. 105° 28′ W. (approximate).

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* *See* plan on sheet No. 1386.

Tides.—It is high water at full and change at 4 hrs., rise of tide about 4 feet.

Scott reef.—In 1855 Captain H. Scott, of the British barque *Druid*, reported that a dangerous patch of breakers existed about 5 miles N.N.E. of Sala-y-Gomez.

Captain J. E. Lopez, commanding the Chilian corvette *O'Higgins* in 1875, reported that he sounded in the position assigned to Scott reef, but obtained no bottom at 465 fathoms. A reef, however, on which the sea breaks was found to lie about one mile N.E. ¼ N. of Sala-y-Gomez, and this position has been accepted for that of Scott reef.

This reef is 100 yards long, east and west, and 50 yards broad, with 16 to 19 fathoms close around, increasing to 40 fathoms at 2½ cables distance, except in the direction of the island, between which and the reef there are depths of 16 to 33 fathoms.

PAUMOTU OR LOW ARCHIPELAGO.*

This vast group of coral islands extends over fifteen degrees of longitude, not taking into consideration the detached islands to the south-eastward. The islands are all similar in character and exhibit great sameness in their features.

From the extent of the archipelago and the character of the islands composing it, they have been discovered by various navigators, whose voyages have extended over a very long series of years.

The first who gave any notice of their existence was Quiros the Spanish navigator who, in 1606, saw several islands on the north and south sides of the group. Le Maire and Schouten in 1616 discovered several islands in the north part, and Roggewein also passed the north part in 1722. Subsequently to this Bougainville (1763), Byron (1765), Wallis and Carteret (1767), Cook (1769, 1773, 1774), Bonecheo (1772–1774), Edwards (1791), Bligh (1792), Wilson (1797), and Turnbull in 1803 have all made additions to the history of discovery.

More exact observations were then made by Kotzebue (1816), Bellinghausen (1819), and Duperrey (1823).

Beechy (1826), Fitz-Roy (1835), and Wilkes (1841) have given more accurate details; since that period the French have made many observations as to their position and character, and from them we derive many of the subsequent details.

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* *See* Admiralty charts :—Pacific ocean, general, No. 2683. Pacific ocean, S.E. sheet, No. 783. Paumotu or Low archipelago, No. 767. Gambier islands, No. 1112, and Hao island, No. 1111.

The inhabitants are not all of the same origin, some resemble the Fijians in figure and the darkness of their skins; others more resemble the Tahitians, but have a more warlike disposition, and apparently speak a different dialect of the Polynesian language to that of Tahiti.

The greater part of these natives are reported to be honest and trustworthy, in the western part they are nearly all converted to the Protestant religion. The French Roman Catholics have an establishment in Anaa and another at Manga Reva.

The islanders navigate amongst the different groups, but the most venturesome are those belonging to Anaa or Chain island. The vessels are double canoes about 35 feet long, connected by a strong framework, which hoist two mat sails on separate masts.

The trade of these islands is carried on by merchants of Tahiti, who are principally English and American, and the commerce is greater than was previously supposed. Owing to the steady cultivation of cocoanut trees, a great increase in the value of copra has taken place of late years; this and pearl shell are the principal articles of trade.

Of the 78 islands composing the group, 18 are uninhabited, they are all coralline or lagoon reefs with three exceptions, and a few have entrances for large vessels.

The whole of this group, with the exception of Ducie, Henderson, Pitcairn, and Oeno islands are under French protection.

WINDS.—These islands lie within the verge of the regular trade wind, which generally blows with considerable regularity throughout the breadth of the Pacific, but from some cause not satisfactorily accounted for, the land small in area and inconsiderable in height has such an influence that it interrupts altogether the regularity of the easterly direction, not only does the easterly wind fail, but heavy squalls come from the opposite direction, and more frequently by night than by day. This is especially the case from November to March.

The effect of the prevalent south-westerly gales in the high latitudes in sending a heavy sea which is felt many hundred miles from the place whence it proceeds, occasions a serious obstacle to landing upon these low islands, by rolling in on the shore in an opposite direction to the trade wind, and therefore making it more dangerous to land upon the lee side of the islands than on the weather.

In September 1877 and February 1878 two hurricanes occurred among the islands of the Low archipelago. They are the first on record, and are reported to have caused much damage among the Manihi or Waterland islands, King George islands, Kaukura or Aura islands, Fakarava or Wittgenstein island, and Anaa or Chain island; the sea is reported to have washed completely across Niau or Greig island, destroying nearly all the inhabitants.

TIDES.—In most of the entrances to the harbours in these islands there is a strong tidal stream which sets in and out alternatively about 6 hours each way, the tide rises about 2 feet. It is high water, full and change, about 1 hour among the western groups, and from half to one hour later among those to the south-eastward.

CURRENTS.—As might be supposed, among such a large mass of islands the currents are somewhat irregular, but during settied weather and a steady south-east trade wind, the surface water generally moves westward from 5 to 25 miles a day; in the rainy season from October to March, when westerly winds, squalls, and rains are frequent, the currents vary most, and occasionally set to the eastward from one half to 2 miles an hour.

To the south-eastward of the Paumotu group lie some islands, which although beyond its limits, belong to no other system, and will therefore be first described.

DUCIE ISLAND, in lat. 24° 40′ S., long. 124° 48′ W., was discovered by Captain Edwards in 1791. It is of coral formation and oval form, lying in a north-east and south-west direction, and is 1¾ miles long and one mile wide.

There is a lagoon in the interior, partly enclosed by trees and partly by low coral flats scarcely above the water's edge; this lagoon appears deep and has a boat entrance which can be used when the sea is sufficiently smooth to allow a boat to pass over the bar.

The height of the soil above the water is about 12 feet, and the trees about 14 feet more, making the greatest elevation 26 feet above the sea.

No living things but birds were seen on the island, and great numbers of fish and sharks abound in the vicinity.

In 1882 the hull of a large vessel was lying on the N.W. side, which proved to be that of the *Arcadia*, wrecked there in June 1881. Though the wind was from the north, force 4, a boat was enabled to land on the north side, but it was necessary to wade as the coral beach runs out shallow. A sandy ridge extending right across the bar, with a heavy surf, blocked the entrance into the lagoon.

Breakers extended for at least half a mile to the southward of the island.*

HENDERSON or ELIZABETH ISLAND, in lat. 24° 21′ S., long. 128° 19′ W., was discovered by a boat's crew from the whaler *Essex*, which was wrecked in 1820; and was afterwards seen by Captain

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* Remark Book, Lieutenant H. Pearson, H.M.S. *Sappho*, 1882.

Henderson. According to Captain Beechey, the island is 5 miles long, one mile wide, and has a flat surface nearly 80 feet above the sea. On all sides excepting the north it is bounded by perpendicular cliffs about 50 feet high, composed entirely of dead coral, which are considerably undermined by the action of the waves.

Landing is extremely difficult on account of the heavy sea rolling in on the coral ledges.

PITCAIRN ISLAND.—This island, which is an English settlement, was discovered and named by Carteret in 1767, but he gave an erroneous idea of its dimensions. Pitcairn derives its interest from being associated with the celebrated mutiny of the *Bounty* in 1789, the details of which are well known.*

After the mutineers had set Captain Bligh and the rest of the crew adrift on April 26th, 1789, they bore away in the *Bounty* for Tahiti, but they reached Tubuai, and this was the only intelligence gained of them as they were obliged to leave on account of warfare with the natives; they then went to Tahiti where Christian, after some of the party had landed, cut the cable and put to sea, and was not heard of for many years; it was afterwards discovered that the *Bounty* had been run ashore at Pitcairn island and burnt by Christian and his followers. Captain Mayhew Folger touched at Pitcairn island in February 1808, to procure seals (supposing the island to be uninhabited, from the account given by Carteret), and for the first time discovered some of the crew of the *Bounty*. As proofs of his discovery, he obtained an azimuth compass and a time piece which had belonged to that vessel, the former was sent to the Admiralty in 1813, and nearly about the same time Vice-Admiral Dixon sent intelligence of their existence to Europe, H.M.S. *Briton* having touched at the island on September 17th, 1814.

The island has since been frequently visited and described, and it has also been proved that the *Bounty's* crew were not the first inhabitants, for several burial places have been discovered containing skeletons, having a pearl shell (not found on the island) placed under the head; stone hatchets and other warlike implements were also among the remains.

The community having been gradually getting too numerous for the capabilities of the island to support them, it was necessary that some important measure should be adopted for their relief. This came in the offer of Norfolk island as a gift, which was accepted, and in June 1856 the whole of the descendants of the mutineers of the *Bounty*, numbering 192, were conveyed there in the transport *Morayshire*.

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* *See* Admiralty plan of Pitcairn island, No. 1113.

For the benefit of future visitors, a bull and nine cows were left on Pitcairn island, but all the pigs were destroyed.

In December 1859 two families, numbering 16 people, returned to Pitcairn island, in the brig *Mary Ann*, as they did not like their new home so well as the old one. They found the island abounding in live stock, goats and fowls innumerable, sheep, and 52 cattle; the latter they unwisely destroyed.

In February 1864, 24 more people returned from Norfolk island; and in July 1884 the population numbered 130.

Pitcairn island is about 2 miles long east and west and one mile broad; the entire circuit of the island with one or two exceptions is perpendicular and will not admit of landing. The highest part being about 1,000 feet renders it visible 40 miles distant. The island is thickly clothed to the summit with most luxuriant verdure, terminating in lofty cliffs, skirted at their bases with thickly branching evergreens. The coast presents unsurmountable obstacles to landing, except at Bounty bay on the north-east side, and a place on the west side of the island, which latter is a good one with winds from the eastward.

The soil of the island is very rich, but porous, a great proportion is decomposed lava, the remainder, a rich black earth.

Sometimes water becomes scarce, as there are no springs on the island; but generally there is plenty of rain, so the island is very fertile.

Bounty bay is the place where vessels usually communicate with the shore, but landing in ships' boats is dangerous and the islanders' boats are nearly always used. Adamstown is situated to the westward of Bounty bay, and according to Captain Beechey is in lat. 25° 3′ 30″ S., long. 130° 8′ 30″ W.

Supplies.—The animals are sheep, hogs, goats, and poultry.

Vegetables consist of yams, sweet and Irish potatoes, the api root and taro in small quantities.

Fruits are plantains, pines, melons, oranges, bread fruit, sugar cane, limes and the vi or Brazilian plum.

The food of the islanders consists mainly of yams and potatoes, animal food occasionally, fish is scarce. Wearing apparel is obtained from whale ships in exchange for vegetables, &c.

One of the inhabitants writing in December 1883 says: "At present " and for the last few years there is scarcely a month that we do not see a " ship; sometimes three or four a week. Since the beginning of Sep- " tember we have had rain steadily with hardly eight fine days."

Winds.—No regular trade winds, in the summer months the wind prevails mostly from E.S.E. to North. Northerly winds are generally light, often accompanied with rain or fog, from north the wind invariably goes round to the westward, from which quarter and S.E. are the strongest gales; when the wind is S.W. the weather is generally clear with moderate breezes. During the winter season the prevailing winds are from S.W. to E.S.E.

Current.—There is generally a westerly current running past the island which is frequently strong.

Temporary anchorage.—In 1884 H.M.S. *Constance* anchored in 17½ fathoms, sand, about half a mile from the shore, with the following bearings:—St. Paul's point just open eastward of Adams rock S.S.E.; Young's rock W. ¼ N. Hitherto vessels have almost invariably laid off and on, and it has been considered injudicious to anchor except in the case of being set on in a calm, the bottom being reported foul.

OENO ISLAND, lying 65 miles N.W. by N. of Pitcairn island, in lat. 24° 1′ S., long. 130° 41′ W., is low and dangerous; coral reef completely surrounds the lagoon, near the centre of which is a small island covered with shrubs, and towards the northern extremity are two sandy islets a few feet above water. The lagoon is fordable as far as the wooded island, but in other places appeared 2 or 3 fathoms deep. Landing is extremely dangerous, if practicable.

The American clipper *Wildwave,* Captain Knowles, was totally wrecked on this reef in April 1858.

MINERVA or EBRILL REEF.—Upon which it was assumed that the ship *Sir George Grey* was lost, in 1865, was searched for on the parallels assigned to it in 1880, by H.M.S. *Alert* between 22° 32′ S. and 22° 45′ S., and meridians 133° 20′ W. and 134° W. The search was made between the 19th and 21st of July 1880, the weather was bright and clear, and a heavy swell running. Several no bottom casts of the lead were made, with from 180 to 380 fathoms of line, and two depths were obtained of 1,775 and 1,275 fathoms, in lat. 22° 34′ S., long. 132° 42′ W., and lat. 22° 30′ S., long. 134° 10′ W., respectively.

As no breakers were observed, or shoal ground found, this reported danger has been expunged from the Admiralty charts.

Winds and Weather.—Exceptionally severe weather, accompanied with strong north-west winds, was experienced by H.M.S. *Alert* towards the end of July 1880, southward of, and in the vicinity of the Paumotu or Low archipelago. It was afterwards ascertained, that at about the same time similar winds and weather were prevailing as far westward in the South Pacific as Tahiti.

PORTLAND REEF was discovered by H.M.S. *Portland* on 23rd May 1853, the bottom was distinctly seen and soundings of 7, 13, and 15 fathoms obtained, and less water was thought to exist. The shoal appeared about 4½ miles in diameter, and from the centre of it Manga Reva bore N. 50° W. distant 40 miles. The position given is lat. 23° 39′ S., long. 134° 21′ W.* The French vessel of war *Lamothe Piquet* searched unsuccessfully for this danger in 1868, and the people at Manga Reva knew nothing of its existence.

TIMOE or CRESCENT ISLAND, the south extreme of which is in lat. 23° 20′ S., long. 134° 29′ W., is the south-eastern of the Paumotu archipelago, it is 3½ miles in length and 1½ miles wide, and of similar formation to Oeno and Ducie islands. It consists of a strip of coral about 100 yards wide about 2 feet above water enclosing a lagoon. Upon this strip of coral are several small islands (the highest about 6 feet above the sea) covered with trees nearly 20 feet high. Landing appeared impossible on account of the heavy surf. The island is uninhabited.

MANGA REVA or GAMBIER ISLANDS were discovered by Captain Wilson, in the ship *Duff*, May 25th, 1797, and named by him after Admiral Lord Gambier. The group consists of an encircling coral reef of an irregular triangular form, enclosing five large, and numerous smaller islands. They are of some importance to the navigator, inasmuch as they afford a supply of water ; the only source, except Pitcairn island, between Tahiti and Peru or Chile.†

The principal island called Manga Reva or Peard island is situated near the centre of the group, and mount Duff, the highest point, 1,315 feet, is near the southern part of the island. The other high islands are called Aka Maru or Wainwright island, Au-Kena or Elson island, Tara-Vai or Belcher island, Aga-Kauitai island, Makaroa or Marsh island, Kamaka or Collie island, Manui island, and Maka-pu island.

Manga Reva island is about 4 miles in length, N.E. and S.W., and mount Duff rises into two peaks in the form of wedges, very conspicuous at a distance, and visible about 45 miles. All the islands are steep and rugged, particularly Makaroa island, which at a distance resembles a ship.

The external form of these islands conveys at once an impression of their volcanic origin, the surrounding reef is conspicuously contrasted to the islands, the coral is fast growing up in the lagoon, and on the north-east side already bears a fertile soil, with trees and habitations. In the opposite direction the reef dips 5 to 7 fathoms below the surface, affording an entrance to the lagoon within. The outer side of the reef springs from a very great depth, the inner descends with a slope to 20 or 25 fathoms.

In 1871 the population numbered 936, and the island is one of the chief Roman Catholic mission stations in the South Pacific.

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* Remark book of Mr. E. Rowe, master H.M.S. *Portland*, 1853.

† *See* Admiralty plan of Manga Reva or Gambier islands, No. 1,112.

The group consists of eight high islands, surrounded by coral islets and reefs, enclosing a lagoon, in which are several secure anchorages; there are however many coral heads, which renders a good look-out from aloft necessary, and even the precaution of keeping a boat ahead.

As these islands afford a supply of water only, the anchorage under mount Duff is most convenient.

Opposite the south-east point of Manga Reva or Peard island is a channel about one cable wide, between the shore reef and the end of a long narrow reef projecting from the western end of Au-Kena. The southern end is marked by two buoys, and a beacon has been erected in the middle of the eastern side of Manga Reva as a mark to steer for. This channel leads into a roadstead called port Rikitea, which is large enough to accommodate a number of vessels. From the shore reef, which forms the western side of the port, the depth increases to 25 fathoms and then shoals towards the coral heads and banks which form the eastern side. The bottom is mud and coral, and the depth rather great for anchoring; the holding ground also is not always good, depending on the slope of the bottom.

Anchorage in port Rikitea during easterly winds is good, but only moderate during those from the westward; good shelter is afforded, but the depths are very irregular, as close to 11 fathoms there may be only one or 2 fathoms, so that on the whole, it is not safe for vessels drawing over 13 feet; still, in a calm, and in case of necessity, a larger vessel might at slack water be hauled in; slack water should be chosen, for at certain times of the tide the current is strong and variable, and the width, in places, not over 160 feet, so that there is no room for turning.

There are three passages into the lagoon, on the south-east, south-west, and west sides, which, by attending to the following directions, may be used with safety.

For entering by the western channel the best mark is the peak of Aka-Maru island, midway between Tara-Vai and Manga Reva islands bearing E.S.E. southerly, and when mount Duff bears N.N.E. ¼. E. a beacon on Au-Kena will be seen in line with a belvedere on the S.W. point of the same island, which, kept in line on an E. by N. ⅓ N. bearing, leads between the coral reefs until the beacon on the east side of Manga Reva is seen between the buoys in the channel leading into port Rikitea, bearing N. by W. ½ W. By keeping the beacon on this bearing a safe entrance may be made into the port, between the buoys, and anchorage picked up as requisite.

The village is on the east side of Peard island, and north-eastward of mount Duff. The flagstaff is in lat. 23° 7′ 34″ S., long. 135° 0′ 20″ W.

According to Captain Beechey the best channel to enter by lies on the south-eastern side of the group, to the southward of all the coral islands, and with mount Duff bearing N.W. ⅝ N. in line with the S.W. point of Maka-pu island off the south end of Aka-Maru. With these marks steer over the reef, upon which there is at this part 6 fathoms water, and pass close to the southern extreme of Maka-pu island, then keeping a boat ahead, proceed under easy sail for the anchorage south of mount Duff. In this situation a ship will be abreast of two streams of good water, but there is some difficulty in procuring it, on account of the coral ledges which surround the island. There are several other anchorages, and water may also be had on the southern side of Au-Kena island, but the above appears to be on the whole most convenient. If intending to proceed into the port on the eastern side of Manga Reva island, cross the reef as above mentioned, steering for mount Duff on a N.W. ⅝ N. course until the beacon on the east side of Manga Reva island bears N. by W. ½ W. between the buoys on either side of the channel leading into port Rikitea, which mark will lead clear of all dangers until inside the port, when anchorage may be picked up as desired.

The best passage to sail out at bears about S.S.W. from mount Duff, with the eastern bluffs of Manga Reva island in line N.N.E. ¼ E. This mark will lead over the reef in 6½ fathoms. Although this channel lies to leeward of the group, there is generally a very heavy swell on the reef, and it would not be advisable to attempt the passage in light winds, as there is no anchorage ground outside; and the swell and the currents, which sometimes run strong, might drift a vessel on a shallow part of the reef, either eastward or westward of the channel, upon which the sea breaks heavily in 4 fathoms, and outside which there is no bottom at 80 fathoms within 40 yards of the breakers.

The plan of these islands must not be considered complete, and there are doubtless many coral heads in the lagoon which have not been discovered; a careful look out aloft is therefore absolutely necessary.

Tides.—During a fortnight's stay of the French ship *Le Somme,* in 1871, it was found to be high water at new moon between one and two hours after noon, greatest rise 3 feet. At ebb tide a strong current enters at the north-west channel and runs thence through the south-west and south-east channels. A current generally sets to the westward in the daytime, and runs strong in the western channel.

MORANE or CADMUS ISLAND, lying 109 miles W. ½ S. of the Gambier islands, is a low coral reef, 5 miles long, by 2½ miles broad, without any entrance to the lagoon, in which are situated three low islands inhabited by a few hostile natives. Position of centre according to the French despatch vessel *Mégère,* lat. 23° 8′ S., long. 137° 8′ W.

MOERENHUT or MARIA ISLAND, 90 miles N.W. by W. of the Gambier islands, in lat. 22° 0′ S., 136° 12′ W., is long, low, and wooded in the centre, the north and south extremes are planted with cocoanut trees.

MARUTEA or LORD HOOD ISLAND was discovered in 1791 by Captain Edwards in the *Pandora*. It consists of a cluster of small islets, rising from a chain of coral even with, or a little above the water's edge. On these islets grow a variety of shrubs and trees. The island is 11 miles long and 4¾ miles wide, uninhabited, and containing a lagoon into which there is no entrance. The West point is in lat. 21° 31′ S., long. 135° 38′ W.*

ACTÆON GROUP, situated about 40 miles west of Marutea, consists of four islands, and was discovered by Mr. Thomas Ebrill in the merchant vessel *Amphitrite* in 1833.

Maturei Vavao or Melbourne Island, the south-easternmost and largest, is about 6 miles long in a north-west and south-east direction, and wooded except on the west side. There is no entrance into the lagoon.

The north-west extreme is in lat. 21° 25′ S., long. 136° 25′ W.

Tenarunga or Minto Island, in lat. 21° 18′ S., long. 136° 31′ W., lies about 8 miles north-westward of Maturei Vavao, and has about 20 inhabitants who are hostile.

Vahanga or Bedford Island lies about 5 miles westward of Tenarunga, and is uninhabited.

Tenararo Island, in lat. 21° 18′ S., long. 136° 45′ W., has about 20 inhabitants, it is wooded and lies 5 or 6 miles westward of Vahanga.

Current.—The current in the neighbourhood of these islands, with a light westerly wind, sets E.N.E., 7 miles in twenty-four hours; but the direction varies with the wind, and usually sets to the westward.

FANGATAUFA or COCKBURN ISLAND was discovered by Captain Beechey in the *Blossom* in 1826. It is a small coral island 3¾ miles in length by 3 miles in width. Its form is nearly oblong, with the southern side much curved.

The lagoon in the centre is deep, the boundary very low and narrow, and in places the sea overflows. It was uninhabited in 1861.

The hillock at the N.E. end is in lat. 22° 12′ S. long. 138° 42′ W.

MURUROA or OSNABURG ISLAND, lying about 20 miles N.N.W. of Fangataufa, was discovered by Captain Carteret in 1767. In 1792, the *Matilda*, a whaler, was wrecked in the night time on a reef the position of which was given as lat. 22° 0′ S., long. 138° 34′ W. In February 1826 Captain Beechey, when exploring the vicinity, determined the identity of these same spots by finding on the reef unequivocal signs of a shipwreck; two anchors, a cannon, metal boiler, and leaden pump, marked 1790. If these were the remains of the *Matilda*, of which there can be but little doubt, a considerable alteration has taken place in the island, as the crew of that vessel describe themselves as having been lost on a *reef of rocks*, whereas the island on which these anchors are lying extends 14 miles in length and has one of its sides covered with high trees, which from the spot where the vessel was wrecked are very conspicuous, and could not fail to be seen by persons in the situation of her crew.

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* Captain Beechey, H.M.S. *Blossom*, 1826.

The island differs from the usual coral formations in having a great disproportion in the growth of its sides. The windward side is covered with tall trees as before mentioned, while the lee side is nearly all under water. The dry part of the chain enclosing the lagoon is about one-sixth of a mile in width but varies considerably in its dimensions; the broad parts are furnished with low mounds of sand, which have been raised by the action of the waves, but are now out of their reach and mostly covered with vegetation. The violence of the waves upon the shore, except at low water, forces the sea into the lagoon at many places, and occasions a constant outset through the channel to leeward. The lagoon which is generally 20 fathoms deep is dotted with knolls of coral which are in some cases close to the surface and dangerous even to boats sailing in the lagoon with a fresh breeze, particularly in cloudy weather as at that time they are difficult to distinguish.

The lagoon was entered by an opening on the west side. The channel was sufficiently wide and deep to admit H.M.S. *Blossom*, but is now closed (1861). There are now about 100 inhabitants who are hostile.

This island, which differs very considerably from the position given by Captain Carteret is in lat. 21° 50′ S., long. 138° 47′ W. (east extreme), a search in the vicinity however revealed no other reef, Osnaburg island and Matilda reef may therefore be considered identical.

TEMATANGI or BLIGH'S LAGOON ISLAND, situated 86 miles west of Mururoa, was discovered by Captain Bligh in 1792 and named by him Lagoon island. It is about 7 miles in diameter. The natives seen by Captain Beechey were all armed with clubs and spears. A portion of these hostile natives were removed to Tahiti in 1858. They were strongly suspected of having eaten the shipwrecked crew of the *Sarah Anne*.

The north point of the island is in lat. 21° 38′ S., long. 140° 40′ W.

TUREIA or CARYSFORT ISLAND, 60 miles N. by E. of Mururoa, was discovered by Captain Edwards in the *Pandora* in 1791. The island is of coral, and so low that the sea washes into the enclosed lagoon. The weather side is wooded, and there is no entrance to the lagoon.

There are only a few inhabitants.

The east extreme is in lat. 20° 45′ S., long. 138° 30′ W.

VANA-VANA or BARROW ISLAND, 32 miles W. ½ S. of Tureia, was discovered by Captain Beechey in 1826. It is a small coral island 1¾ miles in length north and south and about 1¼ miles wide. The island consists of a narrow strip of land about 200 yards wide surrounding a lagoon which the colour of the water indicated was of no great depth.

Upon the shore of the lagoon the pandanus, and cocoanut trees and other bushes constituted a thick wood.

Under these trees three large pits were found containing fresh water. No natives were then seen on the island, but some of their canoes were found on the lagoon. In 1861 there were a few hostile people.

The north end is in lat. 20° 45′ S., long. 139° 10′ W.

DUKE of GLOUCESTER ISLANDS consists of a small group of three islands, which were named by Carteret in 1767.

Nukutipipi or Margaret Island, the easternmost of the group, is a small round lagoon island about 2 miles in circumference, high and well wooded on the north side, with a flat submerged reef on the eastern side.

The south-west point is in lat. 20° 42′ S., long. 143° 5′ W.

Anu-Anurunga or Four Crowns, 13 miles W. by N. of Nukutipipi, was discovered by Quiros in 1606. There are now five clumps of trees on the island. There is no entrance to the lagoon and landing is impossible. No traces of inhabitants were seen.

It is in lat. 20° 38′ S., long. 143° 19′ W.

Anu-Anuraro or Archangel Island, 14 miles W.N.W. of Anu-Anurunga, was named by Quiros in 1606, its true situation and character was determined by the U.S. Exploring Expedition in 1841.

On the 10th of January, Lieutenant Ringgold made what he supposed to be Archangel island, but very much out of the reported position. It is a small lagoon island of oblong shape, lying north-west and south-east, wooded on the eastern sides, with stunted trees. No cocoanut trees were observed. A reef extends off the N.W. and S.W. sides with a heavy surf, and there is a submerged reef on the south and west sides.

There is no entrance to the lagoon and landing cannot be effected without danger.

The centre is in lat. 20° 29′ S., long. 143° 33′ W.

The supposed situation of Archangel island was then searched for, but no signs of land seen.

HEREHERETUE or SAN PABLO was also discovered by Quiros in 1606 and was examined by the U.S. exploring vessel *Porpoise*. The island encloses a lagoon about 3 miles in diameter, but no entrance could be found. The inhabitants, a dark-skinned race, resisted the landing of the Americans.

The north end is in lat. 19° 52′ S., long. 145° 0′ W.

REAO or CLERMONT-TONNERE ISLAND was discovered by Captain Duperrey in *La Coquille* in 1822. It is 10 or 11 miles long, W.N.W. and E.S.E. and very narrow, particularly at the extremities, and when seen at a distance does not appear more than half a mile wide. With the exception of a few breaks on the southern shore, the land is almost continuous. At the extremities and angles the soil is more elevated than in other parts and is covered with shrubs and cocoanut trees. The enclosed lagoon contains several small islets, and the shores all round are steep.

The east end is in lat. 18° 34′ S., long. 136° 20′ W.

PUKARUHA or SERLE ISLAND, 30 miles W. ½ N. from Reao, was discovered by Captain Wilson in 1797 during the missionary voyage of the *Duff*. The island is of coral formation, 7½ miles in length in a N.W. and S.E. direction, and 2¼ miles wide in the broadest part. The windward side is the most perfect, the southern side differs in being wider, and having a barren flat, full an eighth of a mile outside the trees. On this account, it is necessary for a ship to be cautious in approaching during the night, as the land is so low that the breakers would be the first warning of the danger of her situation. The lagoon is very narrow and apparently shallow, with several islands in the middle. Besides the clumps of trees at the extremities, which at a distance have the appearance of banyan trees, there are several clusters of palms, a distinction which is recommended to the commanders of vessels; as besides assisting in identifying the island it will enable them to estimate their distance from them with tolerable precision. There are but few inhabitants and they are hostile.

The south-east extreme is in lat. 18° 22′ S., long. 136° 58′ W.*

TATAKOTO or CLERKE ISLAND, 90 miles N.W. by W. of Pukaruha, is 4 miles in length and one mile broad; the land is very low and encloses a lagoon, into which there is no entrance. The northern part is wooded, and cocoanut trees are abundant.

The southern part is merely reef. The inhabitants are hostile.

A spot on the north side about one mile westward of the north-east extremity is in lat. 17° 18′ S., long. 138° 19′ W.

PINAKI or WHITSUNDAY ISLAND was discovered by Captain Wallis in 1767. It is 1½ miles in length, steep all round, of coral formation, well wooded, and encloses a lagoon. The general height of the soil is 6 feet above the level of the sea; from the trees to the surf there is a space of hard rock nearly 150 yards wide, covered with about a foot of water, beyond which the reef descends rapidly, and at 500 yards distance no bottom could be found with 250 fathoms of line.

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* Captain Beechey, H.M.S. *Blossom*, 1826.

On the inner side from the trees to the lake, is a gentle declivity of muddy sand. The trees, which form a tolerably thick wood round the lagoon are similar to those at Clermont-Tonnerre and consist principally of pandanus and cocoanut.

On the south side there is a very narrow entrance to the lagoon, too shallow for the passage of boats even with a smooth sea.

The north-west extreme is in lat. 19° 24′ S., long. 138° 43′ W.*

NUKUTAVAKE or QUEEN CHARLOTTE ISLAND, lying 8 miles N.W. of Pinaki, is of coral formation and has no lagoon.

There were a few friendly natives in 1861.

The eastern extreme is in lat. 19° 17′ S., long. 138° 49′ W.

VAIRAATEA or EGMONT ISLAND, 22 miles W. by S. of Nukutavake, consists of two islands situated on the same reef, the eastern one being named Puka-runga and the western Puka-raro, runga signifying windward and raro leeward.

The islands are well wooded with cocoanut and pandanus trees. Landing is very difficult and dangerous on account of the heavy swell. There were about 30 friendly inhabitants in 1861.

The north extreme is in lat. 19° 18′ S., long. 139° 18′ W.

VAHITAHI or COOK LAGOON, lying 33 miles N. by W. of Nukutavake, was discovered by Bougainville in 1768. The island is 3 miles in length in a W. by S. and E. by N. direction, and about one mile wide; the southern side is a low reef.

There are large clumps of cocoanut trees on the east and west ends. The enclosed lagoon is in some parts very shallow and contracted, and contains many dry islets. The shore is steep except on the south side, which should not be approached within a quarter of a mile.

Captain Beechey speaks highly of the natives for integrity and good nature.

The north-extreme is in lat. 18° 42′ S., long. 138° 50′ W.

AKIAKI or THRUM CAP ISLAND, 23 miles W.N.W. of Vahitahi, in lat. 18° 30′ S., long. 139° 14′ W., was discovered by Bougainville in 1768. It is of coral formation, three quarters of a mile in length, well wooded, and steep all round. At a mile distant no bottom could be obtained with 400 fathoms of line. No lagoon could be perceived, and the sea ran too high to admit of landing.*

There were a few hostile natives in 1861.

The captain of the French vessel of war *Lamothe Piquet* reported that in 1861 the French flag was hoisted on the north side.

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* Captain Beechey, H.M.S. *Blossom*, 1826.

AHUNUI or BYAM MARTIN ISLAND.—This small island was discovered by Captain Beechey in the *Blossom* in 1826, and named after the controller of the navy. It is of oval form about 3¾ miles in diameter, of coral formation, and has a lagoon into which there is no entrance.

Captain Beechey procured a supply of firewood here, which burnt a long time, gave great heat, and is as hard as lignum vitæ.

The north end is in lat. 19° 37′ S., long. 140° 25′ W.

PARAOA or GLOUCESTER ISLAND, in lat. 19° 8′ S., long. 140° 40′ W., lies 32 miles N.W. by N. of Byam Martin Island. At the south-east angle of the island is a morai or burying place built of stones, but there are no inhabitants.

"In passing to windward of the island, the current unexpectedly set so strong upon it, that the ship was for some time in imminent danger of being thrown on the rocks, and her escape is entirely attributable to the rapid descent of the coral reef, which at times was almost under her bottom." *

MANUHANGI or CUMBERLAND ISLAND, 30 miles W. by S. of Paraoa, in lat. 19° 12′ S., long. 141° 16′ W., was discovered by Wallis in 1767, who described, it as being 6 miles long and 1¼ miles broad. It is wooded except on the south-west side.

NENGONENGO or PRINCE WILLIAM HENRY ISLAND was discovered by Captain Wallis in 1765. Duperrey says the island is about 5 miles wide east and west. The southern island is bare reef on the S.E. and west sides, with a cocoanut grove on the south end.

The south part of the northern island is bare reef with some high clumps of trees on the eastern side. There is a passage into the lagoon on the east side situated about 4 miles northward of the south point of the island. This entrance is about 100 yards wide, and is said to have a depth of 6 fathoms water. The lagoon is reported to abound in pearl shell, in which black pearls are found.†

The east point of the island is in lat. 18° 46′ S., long. 141° 45′ W.

HAO, HARPE or BOW ISLAND was discovered by Bougainville in 1768 and was visited by Cook the following year, who gave the island the latter name from its resemblance to a bow. Its figure protracted upon paper, however, is very irregular, and bears but small resemblance to the instrument after which the island was named, but to a person viewing it as Captain Cook did, the mistake is likely to occur. It is of coral formation, 30 miles long, and has an average breadth of 5 miles, is well wooded on the weather side, but very scantily so on the other, and so low in this latter half, that the sea in places washes into the lagoon. The only entrance is on the north-west side, by which the *Blossom* entered, and which is sometimes dangerous for boats in consequence of the overfalls from the lagoon, especially a short time after high water. The passage may be recognised by two straggling cocoanut trees on the western side, and a clump of trees on the other. There is good landing for boats inside the western entrance point.

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* Captain Beechey, H.M.S. *Blossom*, 1826.

† Paris Notice Hydrographique, No. 1 of 1880.

The time of entry depends on the time of high or slack water as the velocity of the ebb, when much water has been forced into the lagoon, prevents the ship from steering. The lagoon is at all times a difficult place to enter with a vessel drawing over 15 feet. It cannot be entered against the ebb in a sailing vessel without a breeze which would command a speed of at least 6 knots, as the current runs above 4 knots.*

Approaching from seaward, the state of the current can generally be pretty fairly estimated by the " tail race " which sweeps to sea about three-quarters of a mile; directly this slackens or ceases the entrance may be approached, it is, however, very narrow and contracted by a coral knoll in the centre, covered by only 16 feet of water, the trade wind also does not always allow a ship to lie well through. The *Blossom* anchored in the north-east part of the lagoon in 10 fathoms, on a broad patch of sand, about a quarter of a mile from the shore.

Supplies consisting of fish and a few fowls and pigs are obtainable, and fresh water of an inferior quality may be obtained by digging wells, The inhabitants are friendly and obliging.

The morai on the east side of the entrance is in lat. 18° 3′ 38″ S. long. 140° 59′ 15″ W.

AMANU or MOLLER ISLAND, which is separated from the north end of Hao island by a channel 9 miles wide, was discovered by Captain Bellingshausen in 1829. It is 18 miles long in a north-east and south-west direction, and 8 or 9 miles broad. There is an entrance on the west side to the lagoon. The natives are friendly.

The north point is in lat. 17° 40′ S., long. 140° 39′ W.

TWO GROUPS (Marokau, and Ravahere or Dawahaidi) were discovered by Cook in 1773. According to M. Mauruc they are very low, and each encloses a lagoon. There is a canoe entrance to the former in the south-eastern part. They are separated by a narrow channel in which, however, there is room for the largest ship to work.

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* *See* Admiralty plan of Hao or Bow island, No. 1111.

The natives are stated to be friendly.

The south extreme of the southern group is in lat. 18° 18′ S., long. 142° 12′ W.

REITORU or BIRD ISLAND was discovered by Cook in 1769. It is small and low and encloses a lagoon, and resorted to by birds in large flocks for incubation. There are no inhabitants.

The north point is in lat. 17° 48′ S., long. 143° 7′ W.

HARAIKI, ST. QUENTIN or CROKER ISLAND, 32 miles N.W. by W. of Reitoru, is 4 miles long in a north-west and south-east direction, and has a small boat entrance on the south-west side. The island is uninhabited.

The north point is in lat. 17° 29′ S., long. 143° 31′ W.

HIKUERU or MELVILLE ISLAND was discovered by Captain Beechey in 1826. It is low and well wooded and encloses a lagoon, into which there is a passage for small boats.

The north-west end is in lat. 17° 35′ S., long. 142° 41′ W.

TEKOKOTO or DOUBTFUL ISLAND, in lat. 17° 20′ S., long. 142° 37′ W., and 16 miles north of Melville island, was discovered by Cook in 1770; it is a circular reef one mile in diameter, on the west point of which is a conspicuous clump of trees.

TAUERI, RESOLUTION or ST. SIMON ISLAND was discovered by Bonecheo in 1772 and named by Cook in 1773 after his ship. The island is about 4 miles in circumference and consists of two small islets, on which are three clumps of cocoanut trees, but the greater portion of the south and west sides is a bare reef.

There is a canoe passage into the enclosed lagoon on the north-west side; the inhabitants are few and friendly. The south point is in lat. 17° 23′ S., long. 141° 30′ W.

REKAREKA or GOOD HOPE ISLAND, 38 miles N.W. of Taueri, is 5 miles long in a north-east and south-west direction, and about 4 miles broad. There is a boat entrance to the lagoon on the north-east side. The island is well wooded and inhabited by a few friendly natives.

The south end is in lat. 16° 51′ S., long. 141° 55′ W.

MARUTEA or FURNEAUX ISLANDS were discovered by Cook in 1773, they are low and enclose a lagoon; the northern part is wooded and the southern is a rocky flat. In the north-east part is a boat passage. There are but few inhabitants.

The west point is in lat. 16° 54′ S., long. 143° 20′ W.

NIHIRU or NIGERI ISLAND, the north point of which is in lat. 16° 41′ S., long. 142° 53′ W., is about 7 miles across and well wooded near the south-east part. The reef which surrounds this island extends a considerable distance from the south and south-east points, but forms a deep bight just west of the south-east point.

A strong north-easterly current was experienced round the south-east point by the French war vessel *La Mésange*.*

FAKAINA or PREDPRIATIE ISLAND was discovered by Kotzebue in 1824. It is 4 miles in extent E.N.E. and W.S.W., well wooded with palm trees, and encloses a lagoon. The centre is in lat. 15° 59′ S., long. 140° 8′ W.

ANGATAU or ARAKTCHEFF ISLAND, lying 39 miles W. by N. of Fakaina was discovered by Bellingshausen in 1820. The north-west coast is wooded; landing is effected near the west point; with the wind to the northward of east landing is easier on the south coast. There are about 200 inhabitants who are friendly. Missionaries have been established among them.

The centre is in lat. 15° 51′ S., long. 140° 50′ W.

PUKA PUKA, HONDEN or DOG ISLAND, in lat. 14° 50′ S., long. 138° 50′ W., is a coral island enclosing a lagoon which communicates with the sea at very high tides only, by means of two channels on opposite sides of the island. There are no cocoanut trees on the island and no inhabitants.

DISAPPOINTMENT ISLANDS.—This group consists of two islands, the easternmost named Napuka and the western Tetopoto.

Napuka is formed of islets, connected by a coral reef of irregular form enclosing a lagoon.

The east and west sides are well wooded, but the south side is almost entirely devoid of vegetation. There is a landing place about one mile from the west point. The inhabitants, about 85 in number, are hostile.

The north-west point is in lat. 14° 9′ S., long. 141° 14′ W.

Tetopoto lies about 12 miles W.N.W. of Napuka, from which it is visible. The island is thickly wooded with large trees and is about a square mile in extent, having no lagoon, and probably not permanently inhabited.

TAKUME or WOLKONSKY ISLAND is low, and encloses a lagoon, into which there is no entrance. The inhabitants are few in number and harmless. There is a landing place for boats on the west coast about three miles south of the north point of the island.

The village on the northern part is in lat. 15° 44′ S., long. 142° 9′ W.

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* Paris, Annales Hydrographiques, No. 539 of 1874.

RAROIA or BARCLAY ISLAND.—This island is very lightly wooded on the east side, but the north and west sides are covered with vegetation, especially about one mile southward of the west passage and at the south-west point, where the clumps of cocoanut trees are very remarkable. The entrance on the west side can be used by large vessels, but has numerous patches of coral, and the tide runs sometimes from 6 to 8 knots. Captain Lejeune of the *Cassini* observes that there is good anchorage about one mile S.S.W. of the entrance and near a village among the cocoanut trees.

The inhabitants are friendly. In 1873, at the time of the visit of the French war vessel *La Mésange*, they were 75 in number. Cocoanut trees are extensively cultivated, but pearl fishing was prohibited.

Pigs, fowls, fish, and water can be obtained.

The south point of the island is in lat. 16° 13′ S., long. 142° 31′ W.

TAENGA, HOLT or YERMALOFF ISLAND is very low and encloses a lagoon with which there is communication by two passages, a small one on the north-east side and the other about 1½ miles from the south point on the south-west coast, which will admit a vessel of 200 tons.

The north-east coast is well wooded; in the southern part of the island there are only two patches of cocoanut trees, one on either side of the pass. There is a village at the southern extremity of the island which was visited by the *Mésange* in 1873, and the inhabitants were found to be 30 in number.

The pass is in lat. 16° 20′ S., long. 143° 11′ W.

MAKEMO or PHILIP ISLAND was discovered in the *Margaret* in 1803. It lies W.N.W. and E.S.E., is about 40 miles in length, very low, and encloses a lagoon. The north-east part is well wooded.

There are two entrances to the lagoon, one on the north-east side and the other on the western side, which are each divided into three separate channels by two patches of coral. In the N.E. passage any of these may be chosen according to the wind. The anchorage is good, and will be found westward of the reef which bounds the western side of the passage.

The French war vessel *La Mésange* anchored in 7 fathoms, sand and coral, 2 cables S.S.W. of the wharf which lies abreast of a village containing about 100 inhabitants. A second village lies 15 miles westward of the last-mentioned. There is good anchorage off the mole in 7 or 8 fathoms, about 2 cables from the shore. This village is the residence of the chief and contains 50 inhabitants. The *Mésange* entered the lagoon by the N.E. passage, visited and anchored off each of the villages, and left by the west passage, in which the pilot stated there was not sufficient water for a vessel drawing over 16 feet.*

The southern part of the island is but a chain of reefs.

The western side of the N.E. passage is in lat. 16° 36′ S., long. 143° 32′ W.

The western passage is in lat. 16° 26′ S., long. 143° 58′ W.

Supplies.—Pigs, fowls, and good water may be obtained.

Tides.—It is high water, full and change, in the N.E. passage at 3 hours.

Caution.—The ebb tide sets out of the north-east pass with great strength; vessels under sail should therefore not attempt to enter except with a flood tide.

KATIU or SAKEN ISLAND is very low, and encloses a lagoon into which there are two passages, one in the northern part suitable for ships, and the other, a smaller one, in the south-west part.

There is no fixed population.

The west end is in lat. 16° 22′ S., long. 144° 28′ W.

RAEFFSKY ISLANDS consists of three small islands, the southernmost of which was discovered by Bellingshausen in 1820.

Hiti, the easternmost, is uninhabited, and situated in lat. 16° 42′ S., long. 144° 9′ W.

Tuanaka, the northernmost is uninhabited; there is a small passage for boats on the north side.

The centre is in lat. 16° 41′ S., long. 144° 14′ W.

Tepoto, the southernmost, is in lat. 16° 48′ S., long. 144° 19′ W.

It is reported that Katiu and the Raeffsky islands are not placed relatively correct on the charts; as bearings taken gave most impossible results as to the position of the ship.†

MOTUTUNGA or ADVENTURE ISLAND.—This island was discovered by Cook in 1773. It is very low and encloses a lagoon, into which there is a boat passage at the north-west end. The island is occasionally inhabited.

The north-west entrance is in lat. 17° 3′ S., long. 144° 25′ W.

TAHANEA or TCHITCHAGOFF ISLAND.—This island is about 25 miles long in an east and west direction; about 10 miles from the eastern point there are three ship passages into the lagoon at equal distances from each other, about a quarter of a mile apart. The island is wooded on the north and north-east sides, but there are few trees on the south-east coast.

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* Paris, Annales Hydrographiques, No. 539 of 1874.

† Paris, Notice Hydrographique, No. 1 of 1880.

The N.W. point is in lat. 16° 46′ S., long. 144° 58′ W.

ANAA or CHAIN ISLAND was discovered by Cook in 1769, and although one of the smallest is the most thickly populated island of the group, and possesses the best cultivation, exporting a quarter of the exports of the whole group.

It was formerly believed to contain 5,000 inhabitants, or about half the population of the whole archipelago, which large number was accounted for by the conquest of the other islands, and taking the inhabitants as captives; in 1874 the population was estimated at 1,500. The whole island is one cocoanut grove, and in 1873 copra was exported to the amount of 900 tons, and appeared likely to increase in quantity in succeeding years.

A great change has been brought about in the character of these natives since the establishment of the Tahitian missionaries in the island; before this period the natives were cannibals. This change was first evinced by the treatment of the captives, who were allowed if they chose to return to their own islands.

The Roman Catholic mission is established at the village of Tuuhora, on the north part of the island; at this village also are courts of appeal for the archipelago.

In 1860 the natives cut a passage through the reef for boats to approach the village, near a small circular islet, which is in lat. 17° 20′ S., long. 145° 30′ W.

On 7th February 1878 a severe cyclone passed over this island, causing a great deal of damage and destroying the buildings of the French resident of the Paumotu archipelago. This resident is now stationed at Rotoava village on Fakarava island.*

FAAITE or MILORADOWITCH ISLAND was discovered by Bellingshausen in 1819. It is 15 miles in length in a W.N.W. and E.S.E. direction and about 5 miles broad; at the north-west end there is an opening, where small vessels may moor, but only boats can enter the lagoon. The island is well wooded near the western end and there are some clumps of trees on the north and north-east parts, but the southern side is merely reef.

Good water is in greater abundance here than in the other islands, but difficult to procure.

The north-west extremity is in lat. 16° 42′ S., long. 145° 22′ W.

FAKARAVA or WITTGENSTEIN ISLAND.—The lagoon enclosed by this island is 32 miles long and about 10 miles wide, rectangular in form, and having two entrances, one at the north-west and the other on the south-east side.

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* Paris, Notice Hydrographique, No. 1 of 1880.

On the west side of the encircling reef, are six small islets situated about a mile from the outer edge of the reef; the northern and north-western coasts are generally well wooded and have numerous clumps of cocoanut trees.

The cyclone of 1878 passed over this island and caused much damage to some of the trees, &c.

Ngaruae passage on the north-west side is about 7 cables broad, and the least depth obtained was 6 fathoms; it is suitable for the largest vessels, coral patches however may exist. The east side is bordered with a thick grove of cocoanut trees and on the west side there is a low sandy point on which is a pole surmounted by a triangle painted white. Sailing vessels should enter or leave during slack water, or with the tide. After passing through, Punio reef, which is surmounted by very conspicuous black heads and cannot be mistaken, will be observed, and should be left on the port hand, giving it a berth of about 300 yards. About 300 yards W. by S. of Punio reef there is a bank with only 3 fathoms water.

Rotoava anchorage is situated about 5½ miles E. by N. from the entrance and may be recognised by a flag staff on a white pyramid, visible from 2 to 3 miles. The line between Punio reef and the mole on which this pyramid is situated is free of dangers; there are some rocks on either side, but they can all be distinctly seen. Moderate sized vessels anchor in from 7 to 10 fathoms, sand and coral, with the pyramid bearing N.N.E., large vessels anchor further to the westward. A coral reef with 9 feet water, marked by a white buoy, is situated 1½ miles W.S.W. from the mole extending from the pyramid.

The anchorage is excellent in winds from W.S.W. through north to S.S.E. South-easterly winds raise a slight sea, but with winds between S.S E. and W.S.W. the sea is heavy. The village of Rotoava contains about 150 inhabitants.

The French resident for the Paumotu archipelago is stationed at Fakarava and lives at Rotoava village.* The pyramid at Rotoava is in lat. 16° 2′ S., long. 145° 36′ W.

Supplies.—Pigs and fowls are procured with difficulty. Fairly good water is found by digging. Fish caught in the lagoon should not be eaten unless pronounced good by the natives, many species being poisonous.†

Tumakohua, the passage on the south-east side of the island is not recommended for vessels drawing over 15 feet; and with strong winds from the south-eastward a vessel should not attempt to sail out.

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* Paris, Notice Hydrographique, No. 4 of 1882.

† Paris, Notice Hydrographique, No. 1 of 1880

Tetamanu, the village on the north side of the passage, has 140 inhabitants ; fowls, pigs and eggs are obtainable in small quantities and good water easily obtained by digging.

Anchorage.—The anchorage north-west of the village is approached by passing northward of two banks nearly dry. Vessels should anchor close to the shore in from 6 to 8 fathoms, bottom sand and coral. This anchorage is exposed to north-westerly winds.

RARAKA ISLAND.—This island was discovered by Captain Ireland in 1831 and is about 14 miles in length in a north-west and south-east direction. The northern coasts are wooded, and on the south side are seven small wooded islets. There is an entrance into the lagoon on the north-west side in lat. 16° 4′ S., long. 144° 59′ W., navigable for vessels of 100 tons. The ebb tide runs very strong. A small village is situated near the pass.

KAUEHI or VINCENNES ISLAND.—This island was discovered by Captain Fitz-Roy in the *Beagle* in 1835. It is 12 miles long north and south, by 9 miles wide, and has an opening into the lagoon on the south side with 15 fathoms water ; there is good anchorage in the north east part near a large grove of cocoanut trees.

On the south-east part is a high clump of trees, the remainder of the island is covered with a growth of bushes 10 or 12 feet high.

The anchorage is in lat. 15° 50′ S., long. 145° 8′ W.

TAIARO or KINGS ISLAND, in lat. 15° 46′ S., long. 144° 37′ W., was also discovered by Captain Fitz-Roy in 1835. It is low, nearly circular, about 3 miles in diameter and covered with trees and shrubs, which surround a lagoon into which however there is no entrance.

ARATIKA or CARLSHOFF ISLAND was discovered by Roggewein in 1722, and was named Carlshoff by Kotzebue in his second voyage. This island is 8 miles in length east and west, and the highest point at the south-western end is 12 feet above low water, and thickly wooded. There are two entrances, one on the west side, the other a boat entrance on the east.

Temaketa the western passage is about 200 yards long and from 60 to 80 yards wide and appeared safe, the entrance may be recognised by being bordered on the south side by the largest of the wooded islets of the west coast, and on the north by a small cluster of trees.*

The west point of the island is in lat. 15° 33′ S., long. 145° 34′ W.

TOAU or ELIZABETH ISLAND is about 20 miles in length east and west, and has two large openings on the east side. The north-west coast is well wooded, on the south side there is a small wood about 4 miles eastward of the west point, eastward of this wood the sea breaks continuously on the reef which is scarcely ever dry. The north coast is well wooded at intervals, the greatest space without vegetation is just to the westward of Otuni the southern passage.

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* Paris, Notice Hydrographique, No. 1 of 1880.

Orepa passage is the northernmost of the two eastern passages and is adapted for any sized vessels, but should not be entered against the tide. There is anchorage on either side inside this passage.

Otuni passage is the easternmost and has room for small vessels to work in, the eddies run very strong and have been felt 4 miles outside the entrance. The anchorage is southward of the passage.*

Matarina anchorage, which appears to afford shelter in all winds, is situated in the north-west part of the lagoon, and being a somewhat confined anchorage, vessels should moor and secure to the coral.

NIAU or GREIG ISLAND, the north point of which is in lat. 16° 7′ S., long. 146° 23′ W., is about 4 miles north and south, well wooded and visible for a distance of 10 or 12 miles.

The cyclone of 1878 is said to have totally destroyed this island; many of the inhabitants were washed into the lagoon by the surf and drowned; a few were saved by tying themselves to trees.†

KAUKURA or AURA ISLAND is about 20 miles in extent north-west and south-east; upon the north and south sides (especially the latter) a severe hurricane in 1878 caused some enormous blocks of coral (some 30 feet high) to be washed up by the sea, these blocks are visible for about 10 miles.

The western point of the island is well wooded, although the tops of a great number of trees are broken.*

There is a boat entrance on the W.N.W. side.

The west point is in lat. 15° 40′ S., long. 146° 51′ W.

APATAKI or HAGEMEISTER ISLAND, the N.E. point of which is in lat. 15° 18′ S., long. 146° 15′ W., was discovered by Captain Hagemeister in 1830. It is about 17 miles in extent north and south, and has three passes on its west side, leading into the lagoon, the southern pass named Pakaka, and the northern named Tehere, are navigable for large vessels; the middle pass can be used only by small vessels, and with difficulty. In Pakaka pass there are two buoys moored opposite the village. Population, about 50.

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* Paris, Notice Hydrographique, No. 1 of 1880.

† Berlin, Annalen der Hydrographie, Heft. 1 of 1879.

ARUTUA or RURICK ISLAND is about 20 miles in extent east and west. On the east side there is a long passage called Brovaki, which gives access to the lagoon to small vessels.

The natives are of Tahitian origin.

The south point is in lat. 15° 26′ S., long. 146° 44′ W.

TIKEI or ROMANZOFF ISLAND is a small wooded coral island about 10 miles in circumference and having no lagoon. It is inhabited by about 20 natives from the adjoining islands of Ura and Tiokea. From them a few fowls, eggs, and pigs, can be procured. There is landing on the west side, with the prevailing easterly wind.*

The centre is in lat. 14° 56′ S., long. 144° 33′ W.

KING GEORGE ISLANDS was the name applied by Cook to two islands named respectively Ura or Takapoto and Tickea or Takaroa; they had, however, been previously discovered. Tiokea was seen by Roggewein in 1722.

Ura or Takapoto is 13 miles long N.N.E. and S.S.W., and has no passage into the lagoon.

Boats can land at a place named Fakatopatere about 5 cables north-eastward of the south point of the island. There is also landing 2 or 3 miles further to the northward on a part of the reef named Okukina.*

The south point is in lat. 14° 44′ S., long. 145° 14′ W.

Tiokea or Takaroa is 15 miles in length, N.E. and S.W., and on the south-west side is an entrance named Tehavaroa which will admit vessels of 9 feet draught. A large white pyramid situated near a wharf in the interior of the lagoon is visible from seaward, and is a good mark for the entrance, in which the tide seldom runs strong enough to prevent a vessel from entering far enough to anchor, when she can either be warped in or wait until the flood tide, and secure to the wharf.

The moorings in the wharf are very safe, even with winds blowing from the entrance; the inhabitants say, that during the cyclone of 1878, when the sea swept away the houses near the wharf, not one vessel, well secured, was in any danger, for the water coming from the land formed a counter current which kept the ships away from the wharf; but with strong westerly winds it is better to haul further in.*

Supplies.—Fish, fowls, and eggs can be obtained and water is abundant.

The flag staff near the pyramid is in lat. 14° 27′ S., long. 145° 0′ W.

MANIHI or WATERLAND ISLAND was probably discovered by Le Maire and Schouten in 1616, and is about 13 miles in length N.E. and S.W.; on the south-west side is a passage called Pacua.

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* Paris, Notice Hydrographique, No. 1 of 1880.

Many cocoanut trees were seen on the island and fresh water can be procured on the S.W. side, where the land is about half a mile wide. No soundings could be obtained with 100 fathoms of line close to the reef.

The cyclone of 1878 caused great destruction among the cocoanut trees of this island.

The east end is in lat. 14° 23′ S., long. 145° 50′ W.

AHII or PEACOCK ISLAND.—The coral belt of this island is similar to that last described, and is about half a mile in width. The greatest length is about 13 miles, and there is an entrance for boats into the lagoon on the west side.

The west point is in lat. 14° 33′ S., long. 146° 24′ W.

NAIRSA, VLIEGEN, or DEANS ISLAND.—This island, called Rangiroa by the islanders of the eastern Paumotus, is generally known by the natives of the island as Rahiroa.

The coral belt is very narrow and encloses an extensive lagoon about 40 miles in length, E.S.E. and W.N.W., into which there are three passages, two of which are navigable by large vessels.

Tivaru is the name of a passage for small craft and boats situated on the west coast.

Avatoru entrance is the westernmost of the two openings into the lagoon on the north side of Nairsa island, and is near the north-west point. This passage is navigable by large ships, but it is advisable to go through with a favourable tide, as the eddies are sometimes strong; the least depths obtained by the French war vessel *La Mésange* were 6½ fathoms at the entrance, and 8¾ fathoms near the inner part of the passage.

A little northward of the inner point of the passage, on the east side, is a mole or wharf constructed of coral slabs, at which small vessels unload when prevented by the current from entering the lagoon.* The village of Atimaro commences at this inner point, and extends eastward for 500 or 600 yards. At the eastern end of the village a second mole has been built upon some reefs nearly level with the water, and enclosing a space in which the native small craft take shelter from the heavy sea which sets in with strong winds from the south-eastward.

The village of Atimaro contains 200 inhabitants, who possess ten schooners of from 8 to 12 tons. The village formerly on the western shore of the passage has been abandoned.

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* This mole was demolished by the cyclone of the year 1878. Paris, Notice Hydrographique, No. 1 of 1880.

Facing the passage on entering is a wooded islet, on either side of which there is a channel. Shoal water extends off the north-east point of this islet, and also off the inner east point of the passage, but both dangers are distinctly visible.

La Mésange used the eastern channel, between the islet and the village, in going from the outer to the inner anchorage.

Anchorage.—There is anchorage in the passage off the outer wharf, in 8¾ fathoms. The strength of the ebb stream here was found to be 3½ knots. The inner anchorage off the east end of Atimaro village is about 200 yards off the second mole, and a little to the northward of it.

Entering by the eastern channel, give the village point a berth of 80 to 100 yards.

Small craft anchor about 80 yards from the wharf in 5½ fathoms, and secure to an anchor on the coral northward of the wharf.

With easterly winds the currents, which usually set to the westward, are feeble near Nairsa island.

Tiputa or Atifareura entrance is the easternmost of the two openings on the north side of Rahiroa island; it is narrower than Avatoru entrance, more tortuous, and the currents are stronger, but is reported practicable for large vessels. There is a bare islet a little westward of the inner part of the passage.

On the north shore of the lagoon, and at about half a mile eastward of Tiputa entrance, is a small mole, which gives the native craft sufficient shelter against the sea from the south-east.

Anchorage.—The anchorage is about 2½ cables off shore to the eastward of the mole in 10 or 11 fathoms, coral and sand.

Tiputa village is to the eastward of Tiputa entrance; the inhabitants number 300, who possess 12 schooners of from 6 to 15 tons.

In the Avatoru and Tiputa entrances the tidal streams cause strong rips or eddies (opape), which are dangerous for boats; during the flood they are found at the inner parts of the entrances, and during the ebb near the outer parts.

Dangers.—A coral bank was seen at about 3 miles S.S.E. of the wooded islet of Avatoru; and a second bank lying about S. by E. ½ E. from Tiputa entrance, distant 8 miles, which the natives report to be of a circular shape, about 150 or 200 yards in diameter, and to have 2¾ fathoms. No other dangers in the lagoon are known either to the natives or pilots. Two soundings of 17 and 19 fathoms were taken about 6 miles south of Tiputa.*

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* Paris, Annales Hydrographiques, No. 533 of 1874.

TIKEHAU or KRUSENSTERN ISLAND is somewhat circular in form, about 10 miles in diameter, and distinguished by having a small island thickly overgrown with trees, situated in the centre of the lagoon.

Tuheiava pass on the west side is suitable for the largest vessels, and is in lat. 14° 58′ S., long. 148° 14′ W.

MATAHIVA or LAZAREFF ISLAND is the western-most island of the Low archipelago, and was discovered by Bellingshausen in 1820. There is a boat entrance on the north-west side. The island is well wooded, and in the north-west part there is a village.

The west point is in lat. 14° 54′ S., long. 148° 40′ W.

MAKATEA or AURORA ISLAND, the north point of which is in lat. 15° 48′ S., long. 148° 13′ W., is a coral island uplifted; the perpendicular cliff appears worn into caverns, and the height is 230 feet, rendering it visible for a distance of 20 miles. The coral shelf is 500 feet in width on the north side of the island, and gradually diminishes in width towards the western part. The north, east, and west sides of the island present perpendicular cliffs, but the south side descends less abruptly. The island is covered with vegetation and some large trees, and portions are cultivated.*

On the western side of the island there are several small openings in the encircling reef, through which landing is practicable for boats during strong easterly winds. When between two very wooded summits on the western side of the island, the reef will be found steep-to, and can be approached to within 60 yards, thus avoiding the heavy sea and strong current.

There is said to be an anchorage northward of the west point of the island.†

The village is situated in a bay in the middle of the east coast of the island and consists of about 30 houses.

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* Paris, Notice Hydrographique, No. 14 of 1882.

† Paris, Annales Hydrographique, No. 533 of 1874.

CHAPTER IV.

MARQUESAS ISLANDS.—SCATTERED ISLANDS NEAR THE EQUATOR.

VARIATION IN 1885.

Fatu-hiva	5° 55′ E.	Penrhyn island	7° 25′ E.
Eiao	5 25 E.	Jarvis island	6 45 E.
Caroline island	6 40 E.	Palmyra island	6 55 E.

MARQUESAS ISLANDS.

The Marquesas archipelago is composed of two tolerably distinct groups, lying in a general north-west and south-east direction, between the parallels of 7° 50′ and 10° 35′ S., and the meridians of 138° 25′ and 140° 50′ W. They are all high and of volcanic origin, and may be seen in clear weather at a distance of from 50 to 60 miles.*

The southern group was discovered by Mendaña in 1595, who named them the *Islas de Marquesas de Mendoça* in honour of the viceroy of Peru, who had despatched the expedition.

The southernmost island was first sighted and named La Madalena by Mendaña, who imagined it to be a portion of the Solomon islands discovered by him twenty-eight years previously. His first interviews with the natives were friendly, but the brutality of one of his men, led to an outbreak and great slaughter.

Three others of the southern group were also named by him San Pedro, Santa Christina, and La Dominica. The remaining island, named Fatu-huku or Hood island, was named by Cook in 1774 after a midshipman, afterwards Lord Hood, who first saw it.

The north-west group, consisting of six islands named respectively Ua-pu or Adams island, Ua-Huka or Washington island, Nukuhiva or Marchand island, Motu-iti or Hergest rocks, Eiao or Masse, and Hatutu or Chanal island, was not discovered till 1791 by Captain Ingraham, of the American ship *Hope*, of Boston.

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* *See* Admiralty charts:—Pacific ocean, general, No. 2683 ; Pacific ocean, S.E. sheet No. 783 ; Marquesas islands, No. 1640.

A few weeks later, Captain Marchand, of the French ship *La Solide*, also discovered them, and called one of them Marchand island, naming the whole group *Iles de la Revolution.*

In 1792 Lieutenant Hergest in the transport *Dædalus* surveyed them, and in 1793 Captain Josiah Roberts, of the American ship *Jefferson*, gave them the name of *Washington islands*, a name also applied to Ua-Huka by Ingraham, their first discoverer.

The Marquesas, although of volcanic formation, have no active volcanoes, and do not appear to be subject to earthquakes; they are all high and the land is very irregular and broken. The greater number of the mountains are in the interior, and ridges extend from them to the coasts, between which are valleys more or less fertile, in which the different tribes are established. The natives do not appear to have any form of government, each tribe living separately and independently, from this reason quarrels and wars are frequent. At different periods various missionaries have endeavoured to establish themselves, but with little success; this is probably owing in a great measure to the bad advice and example of the white deserters from calling vessels, which people are found living amongst them in the same manner, and aiding in their disputes and wars.

The sovereignty of the Marquesas group was ceded to France in May 1842, and a military colony was established at Taï-o-haé bay in Nukuhiva, but the result was in no way commensurate with the expense of the establishment and it was abandoned in 1859.

The group is now governed by a French resident at Taï-o-haé. His orders are carried out by the native chiefs. The inhabitants of Dominica were troublesome until 1880, when their submission was secured by a military expedition under Admiral Du Petit Thouars.*

Nukuhiva or Marchand is the principal island of the group, and Taï-o-haé is now the principal settlement. The whole of the group is peculiarly adapted for the growth of cotton, which is sent either to New Zealand or San Francisco for shipment to Europe.

A line of American schooners, fore and aft rigged, having a contract with the French government for carrying the mails, run monthly from San Francisco to Tahiti, calling at Taï-o-haé, making the passage to the latter place in seventeen days, and thence to Tahiti in four days; the return passage from Tahiti direct to San Francisco is accomplished in twenty-seven to thirty-three days. These schooners bring as cargo, lumber and sundries, returning with cotton and fungus, the latter article being for the Chinese market.

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* U.S. Hydrographic Notice, No. 62 of 1882.

The climate of these islands must always be very sultry; notwithstanding this it appears very healthy and the Europeans living here state that such is the case, an assertion which is justified by their appearance.

WINDS.—From April to October the south-east trade wind, called by the natives *tua-to-ha* prevails in the vicinity of these islands. The general direction is E.S.E., but it varies between east and S.S.E. During the rainy season, from November to January, the wind is more to the southward, and fresh S.S.W. winds with squalls are experienced, lasting three or four days. From October to April, the prevailing wind, called by the natives *tiu*, is from E.N.E. veering and hauling between east and N.N.E. The wind sometimes gets to the west of north, when it is apt to turn into a gale. Gales are, however, of rare occurrence.

THE CURRENTS are usually to the westward, between W.N.W. and W.S.W., with a velocity of about half a knot an hour, sometimes, however, attaining a velocity of 3 knots. During westerly winds their direction sometimes changes. After a week of north-westerly winds, a current setting to the eastward at the rate of 3 knots an hour was observed in Bordelais strait,

DIRECTIONS.—All these islands are high and steep to, and only ordinary precautions are necessary in navigating; sailing vessels, however, should not approach the land too closely, even with a fresh breeze, as the wind sometimes dies away suddenly and the swell and current set towards the projecting points. Vessels working to windward for Nukuhiva should never stand to the northward of the parallel of that island, as there they are likely to encounter calms and strong westerly currents. When boating to places situated to windward it is best to skirt the shore as closely as possible, as a considerable counter-current may be found, but the heavy broken seas encountered near the projecting points might render the course unadvisable for a loaded boat.

Pilots are hardly necessary in this group, but they may greatly assist sailing vessels in making a port by their knowledge of puffs and shifts of wind.

Supplies.—Cattle are abundant on the islands of Nukuhiva and Tau-ata. The Roman Catholic mission has about 1,500 sheep on the island of Ua-pu, and a number on Hiva-oa or Dominica Island. Eiao is also stocked with cattle.

Population.—The result of a census taken in 1879 gave the total population of the Marquesas islands as 5,754, of whom 109 were Europeans, 69 Chinese, 132 Polynesians, and the remainder natives.

FATU-HIVA or MAGDALENA ISLAND, the southernmost of the Marquesas group, is 8 miles in length, north and south, and 4 miles wide; the highest point is 3,675 feet above the sea.

The eastern side of the island is extremely rugged, steep ridges coming down from the central mountain, and terminating in high precipices over the sea. Very few of the valleys or gorges appear to reach the beach, so that, independent of a dangerous surf which dashes against the rocks, landing would be impracticable. On the north and south sides of the island, the land slopes more regularly towards the sea, but there is no landing.

Point Venus, on the south side, is a perpendicular rocky cliff about 1,900 feet high overhanging the sea, which breaks within a few yards of its base; from some points of view the break assumes the appearance of a reef extending out further than it really does.*

Anchorages.—There are two anchorages on the west coast; one in Omoa or Bon Repos bay, near point Venus, and the other in Hana-vave or Virgins bay about 4 miles to the northward. Both bays are entirely open to the westward, and when westerly winds are threatened, it is necessary to put to sea.

Omoa or Bon Repos bay is easily found, being at the south-west extremity of the island; the northern headland is a point of black rock 100 feet high. The anchorage is not of the best, and a heavy surf rolls continually on the beach, but landing can be effected on the rocks on either side of the bay, according to the direction of the swell.†

Directions.—A slender rock of remarkable appearance rises vertically above the huts that line the shore; steer for this rock bearing east; the gendarmerie flag-staff will soon be seen and should be kept open a little to the northward of the rock. Anchor near this alignment in 9 or 10 fathoms, 1¾ cables from the shore.

A stream which comes down about the middle of the beach produces quite a current, setting out of the bay.‡

Supplies.—Water can be obtained, but with difficulty, as boats must lay a considerable distance from the beach where the stream comes down. The valley, which winds up among the hills from the bottom of the bay, is very beautiful, being covered with the rich foliage of tropical fruit trees, whilst the native cottages and huts, sheltered under the bread-fruit, cocoa-nut, and orange trees, add greatly to the attractiveness of the scene.

Fruit of all descriptions are to be procured in sufficient quantities to refresh a large ship's company; but meat and vegetables are scarce, pigs and poultry being the only animal food. The inhabitants are about 600 in number.

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* Captain R. A. Powell, H.M.S. *Topaze*, 1867.

† *See* plan on Admiralty chart, No. 1640.

‡ U. S. Hydrographic Notice, No. 62 of 1882.

The men, who are of ordinary stature, with good features, are rendered hideous by tatooing; the women are fairer than the men, and pleasant looking, as they are only tatooed on the face, with a few blue marks on the lips.*

Hana-vave or Virgins bay affords better anchorage than the foregoing; there is also less swell, and landing is easier.†

Directions.—Having made out the mission church, which can be seen from a considerable distance, keep it just open of the high land to the northward about E. ½ N. Anchor in from 19 to 23 fathoms soon after the outer coast of the island is shut in by the south-west point of the bay.

The holding ground is good and the squalls though violent are not dangerous, they blow out of the bay and vessels only risk being blown off the land.

There is a sandy beach at the head of the bay, where landing is almost always easy. Boats can also land alongside some flat black rocks on the north side at the foot of some cliffs from 250 to 400 feet high.

The southern extremity of the beach is in lat. 10° 27′ 6″ S., long. 138° 39′ 5″ W.

Supplies.—Fruit, pigs, and poultry can be obtained. Water is abundant and can be obtained without difficulty.

Tides.—It is high water at full and change at about 3 hours 50 minutes. The rise and fall about 3 feet.‡

Caution.—Sailing vessels passing to leeward of Fatu-hiva should not approach the land nearer than 3 miles as they are likely to be exposed to very strong squalls off Hana-vave and afterwards to calms and a heavy swell.‡

THOMASSET ROCK, discovered by the *Ariane* in 1844, is situated 14½ miles E. by N. ¾ N. from the north point of Fatu-hiva in lat. 10° 21′ S., long. 138° 25′ W. The top is 13 feet above the sea and great caution is necessary when navigating in this vicinity at night.

MOTANE or SAN PEDRO is 5 miles in length N.N.W. and S.S.E., 1,640 feet high and wooded on the summit. Separated from the S.E. point by a narrow boat channel is a large high rock, in lat. 10° 1′ S., long. 131° 48′ W.

The island has no fixed inhabitants.

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* Captain R. A. Powell, H.M.S. *Topaze*, 1867.

† *See* plan on Admiralty chart, No. 1640.

‡ U. S. Hydrographic Notice, No. 62 of 1882.

TAU-ATA or SANTA CHRISTINA ISLAND is 9 miles long in a north and south direction, and 5 miles across in the widest part. A narrow ridge of hills, of considerable height, extends the whole length of the island, the highest summit attaining a height of 3,280 feet. There are other ridges, which rise from the sea, and with an equal ascent, join the main ridge. These are separated by deep narrow valleys watered by fine streams of excellent water.*

The inhabitants in 1880 were estimated at 450.

The formation of the island, having a steep shore on the east, and numerous valleys on the west sides, closely resembles Magdalena island, and the facilities for watering and obtaining supplies are about the same. There are wild cattle on the mountains, but difficult to get at, and still more difficult to carry away when shot.

Vaitahu or Resolution bay is situated near the middle of the west side of the island and under the highest land. The French settled in this bay in 1842, but it is now entirely abandoned, and fort, houses, and gardens have fallen into a state of decay. The south point of the bay is a steep rock of considerable height, terminating at the top in a peaked hill. The north point is not so high, and rises with a more gentle slope.

There are two sandy beaches in the bay, divided from each other by a rocky point. In each there is a rivulet of excellent water, the northern cove named Vaitahu is the most convenient for wood and watering; here there is a small waterfall mentioned by Quiros; the village in the southern cove is named Hanamiai.

The sea breeze is rarely felt at this anchorage, but with northerly winds there is swell enough to cause a vessel to roll disagreeably. The rare winds from west and W.N.W., blow directly into the bay, but they do not produce a correspondingly heavy sea, and with ordinary precautions there need be no fear of dragging.*

Directions.—The best marks for finding this bay are fort Halley, which is built on a hill and can be seen from a long distance when bearing between east and S.E., and two large white houses on the beach. In any case a vessel placing herself on the meridian of the west point of Tau-ata, and running north or south until the west extreme of Dominica island bears N. by W. ¾ W., or until Bordelais strait appears completely closed, will be off Resolution bay.

Sailing vessels from the eastward with the trade wind should pass northward of the island and run down the coast. The breeze drawing along the land will carry them almost to the entrance. Entering the bay they should skirt, as closely as possible, the northern point, which is steep-to. Whilst working in they should watch the puffs carefully, as vessels are often struck by the gusts from the hills when in stays.

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* *See* plan on Admiralty chart, No. 1640.

Anchorage.—The *Topaze* anchored in 26 fathoms, with west point of Dominica island bearing N.N.W.; north point of bay N. by W.; south point of bay S. by W.; and extreme of land S. by W. ½ W.; and remained here two days without experiencing any difficulty from the swell, or squalls from the mountains. There is no doubt, however, that a heavy swell sets in from the south-west.*

The best anchorage is in from 10 to 13 fathoms, sand, off the ravine with the two cocoa-nut palms. The violent gusts down the valley may cause a vessel anchored on a sloping bottom to drag off, but if anchored well to the northward she will clear the south point of the bay.

Landing.—Boats can land on the beach in the southern part of the bay, where there is no coral, while the weather is fine, but the usual landing place is at the steps cut in the rock to the northward of the beach.†

The landing-place—constructed by the French authorities at considerable expense—has been washed away, and there are other marks of destruction by the waves. Reports say that vessels have been driven to sea by the force of the violent gusts down the valleys, and altogether the bay has such a bad character that whalers seldom enter, although it is believed to be the only place where ships are advised to anchor.

Hapatoni bay, two miles south of Resolution bay, is a bad anchorage occasionally used by whalers. A rock shaped like a tower on the south point of the bay, marks the entrance. Boats land in a little creek sheltered by a point. A small stream of inferior water runs over the rocks, where landing is difficult and taking in water a complicated operation.

BORDELAIS STRAIT, separating Tau-ata from Hiva-oa, is 2½ miles wide, and both sides are clear and safe. There is always a fresh breeze and a relatively rough sea in this channel. The current sets generally to the westward with a velocity of from 2 to 3 knots, at which time it is almost impossible to beat through to the eastward. When westerly winds have prevailed for some time the current is reversed and sets eastward with about the same velocity.†

HIVA-OA or DOMINICA ISLAND.—This island is the most fertile and populous, as well as the most important for its production, of the whole group. It is 21 miles long east and west, with an average breadth of 6 miles.

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* Captain R. A. Powell, H.M.S. *Topaze*, 1867.

† U. S. Hydrographic Notice, No. 62 of 1882.

The French have no settlement on Dominica, but there are two or three priests on the island, one of whom stated that they had entirely failed in making converts, and that in his opinion there was not a native Christian. He also described the inhabitants as being inveterate cannibals, always at war with each other, much addicted to drunkenness and other bad habits. The priests had succeeded in cultivating cotton, and had lately sold their produce for 2,000*l*.

The island has some well-watered beautiful valleys, and was described as being extremely rich, and well suited for coffee, sugar, and other tropical productions.*

In 1880 the native population of Hiva-oa was estimated at 2,500.

Cape Balguerie is the eastern point; the hill rises above it to the height of 1,280 feet, and at the foot are several isolated rocks, the northernmost of which is in the shape of a truncated cone. The coast to the westward of this consists of barren cliff and white sandy beach without shelter or inhabitants for a distance of 5 miles, at which distance is situated Périgot bay.

Puamau or Périgot bay may be recognised by its wooded amphitheatre and the mountains round, the western one of which is 2,820 feet high. The hill on the east side is 575 feet high and surmounted by an obelisk or column. The Roman Catholic mission and the fort on the west side of the bay are also good marks.†

About 1½ cables from the east point are the Jacquemart rocks, but coming from the westward they cannot be distinctly made out. Although the depth between these rocks and the point is from 7 to 11 fathoms, it is advisable to pass westward of them. Sailing vessels should invariably observe this rule as the wind is very apt to die away near the land.

Anchorage.—The best anchorage is in from 10 to 12 fathoms with the following bearings: the west point of the bay in line with the east point of Hood island N. by W. ¼ W.; and the obelisk on the east point of the bay E. ¾ S.

During the years 1880 and 1881 the French war vessel *Chasseur* anchored frequently at Périgot bay in all kinds of weather. There is always a swell, and with the wind to the northward of east vessels will roll very disagreeably.

With a fresh breeze from N.E. to N.N.W. the sea becomes heavy in the bay. The holding ground is very good. Steamers have little difficulty in putting to sea, but sailing vessels often find some difficulty, especially during the season of N.E. winds, from October to April; the land breeze frequently fails, and as the swell and the current set directly against the west point there is great difficulty in doubling it.

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* Captain R. A. Powell, H.M.S. *Topaze*, 1867.

† *See* plan on Admiralty chart, No. 1640.

Landing on the open beach is very difficult and often impossible. Boats usually land on the east side on a small beach protected by some rocks which extend to the south-westward; the place is marked by a conspicuous tree. The bay is very populous but has few resources.

The Coast.—Proceeding along the coast to the westward there is a wide bay called by the natives Hana-hepu, then a small wooded bay called Jaone, and further on the inhabited bay of Naa-o-he. Then come Ma-tura and Sha-nahe bays, the latter of which is said to afford anchorage for small vessels, and may be recognised by the iron-wood trees which cover the western cape.

Westward of Sha-nahe is the large open bight of Hana-paa-owa, where there is neither landing nor anchorage. There is a church and a few huts among the trees.

To the westward of this bight the coast trends directly to the northward for a distance of about 2 miles to the northernmost point of the island. Beyond this point the general trend of the coast is east and west.

Rock.—About 5 cables N. by E. from the north point is an isolated rock, just awash, on which the sea breaks continually; there is plenty of water between the rock and the coast.

Hana-te-Kur bay lies 1½ miles to the westward of the before mentioned rock. Coming from the westward the church in the middle of the beach is a good mark. Hood island bears N. ¾ E. from the east point of the bay.

The anchorage is in 6½ fathoms, midway between the two sides of the bay.

Landing place.—Boats can land without difficulty on the western part of the beach, near a small stream of excellent water.*

Hana-iapa bay affords good anchorage, with sufficient shelter during N.E. winds, and the holding ground is good. Good marks for distinguishing this bay are Borne island, 49 feet high, situated off the west point of the bay, and a fine cascade, which can be seen from seaward at a distance of 10 miles, situated about one mile westward of the bay. The anchorage is in 10 or 11 fathoms, with the east point of the bay in line with Hood island. Boats land on the eastern end of the beach, behind a little point of rocks, around which, and at a distance of about 100 yards, there is a line of breakers which must be left on the port hand going in.†

A fine stream of water flows into the bay close to the landing place.

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* U. S. Hydrographic Notice, No. 62 of 1882.

† *See* plan on Admiralty chart, No. 1640.

Caution.—The current sets generally to the westward, and the wind dies away at the entrance of the bay, giving place to the land breeze. Sailing vessels, therefore, entering this bay, should work well to windward and run in with a free wind, passing about 200 yards from the east point. The passage between Borne island and the west point is dangerous for sailing vessels.*

Hana-menu bay is situated near the north-west point of Hiva-oa; it is a double bay separated by a high cliff of dark rocks like an enormous tower. The bay is much used by whalers, and may be recognised, even at night, by the high cliff before mentioned. Sailing vessels can make this anchorage without difficulty, for the sea breezes draw round the east point of the bay. In putting to sea, they should take advantage of the land breeze, or kedge out.†

With the wind from S.E. to east the sea is smooth; with a N.E. wind the swell is felt in the bay, but the sea is rarely heavy. The land breeze ordinarily makes at about 7 p.m. and subsides at daylight.

Anchorage.—The best anchorage is in the eastern bay, in 11 fathoms, with the west point of the bay a little open of Tower rock. Landing is easy and there is an abundance of good water.

Coast.—From the western point of Hana-menu bay, the west coast of Hiva-oa curves away to the southward and south-eastward for about 12 miles, to the south-east point of the island, named Hiva-oa point. Immediately to the north-eastward of the point is a deep bight named Vi-pi-hai or Traitors bay.

In the north-west part of the bay is the small rocky island of Hanake, which is about 120 feet high and very steep to.

To the westward of the island the coasts of the bay are constantly exposed to the winds and sea, and anchoring is impossible near the shore; landing is always very difficult, if not impossible.

Taa-hu-ku bay is situated to the eastward of Hanake island, and is not easy to make out if coming from the eastward.

An excellent mark for recognizing this bay is a steep grassy slope on the west side of the head of the bay, with several houses and buildings on the summit, called a fort by the authorities in charge. In 1883 the fort contained four brass howitzers, and was manned by an officer and 35 men.‡

The extreme of Hiva-oa point in line with the eastern extreme of Tau-ata island, leads nearly up to the entrance. Having left the island about 300 yards on the port hand, the entrance will be seen ahead; the western entrance point being black, and the eastern a low flat point. A fort constructed on the summit of a hill on the west side and a road which runs along the west side of the bay are equally good guides.

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* U. S. Hydrographic Notice, No. 62 of 1882.

† *See* plan on Admiralty chart, No. 1640.

‡ Remark book, Lieutenant D. A. Wright, H.M.S. *Kingfisher*, 1883.

The bay is well sheltered, and there is good anchorage for vessels of medium size ; a large vessel could haul in and moor in all security. The holding ground is good. The sea breezes are never felt, but the swell is sometimes disagreeable. With the wind from S.E. to east, the sea breaking on the west side of the bay is thrown back against the east side and sometimes produces a strong chopping sea.*

Anchorage.—The usual anchorage is in the middle of the bay in 5 or 6 fathoms. Sailing vessels should skirt the east point at a distance of about 40 yards, and their headway will thus generally carry them up to the anchorage. The land breezes, blowing from north to N.E., generally prevail during the night ; they attain their greatest strength in the morning, and fall between 8 and 9 o'clock. Sailing vessels going out may profit by this circumstance.

Vessels not wishing to enter the bay, can anchor to the southward of the entrance, in 17 fathoms, muddy sand, about one mile eastward of Hanake island, with the following bearings : north point of Motane, S.E. by E. ½ E. ; east point of Tau-ata, S. ½ E.

Landing place.—Access to the beach is often difficult. The best place is on the beach on the east side. A stream of water on the west side affords abundance of good water during the rainy season.

Currents.—The currents set generally to the westward along the south coast of Hiva-oa, but in Traitors bay, they follow the trend of the coast and set towards Hiva-oa point. After rain their strength is considerably increased owing to the numerous streams which fall into the bay.

Coast.—Between Taa-hu-ku bay and cape Balguerie there is no good anchorage, the coast generally consisting of perpendicular cliffs of considerable height.†

FATU-HUKU or HOOD ISLAND.—This island was discovered on board Cook's vessel, the *Resolution*, in 1774, by a midshipman who was afterwards Lord Hood, and lies about 15½ miles north of Hiva-oa. It is 1,180 feet high but of small extent, and consists of a single high, and at the summit, flat rock, with a gentle slope from north to south.

D'Urville says that about one mile to the N.N.W., is a sunken rock which breaks in fine weather. The natives state that landing is impossible. Canoes from the neighbouring islands occasionally resort here for fishing purposes.

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* *See* plan on Admiralty chart, No. 1640.

† U.S. Hydrographic Notice, No. 62 of 1882.

UA-PU or ADAMS ISLAND.—This island is about the same size as Tau-ata and equally elevated, bold, and rocky. The summits of many of the mountains present conspicuous columns, spires, and pinnacles of rock; the highest point is 4,042 feet high. In the south-east part of the island, is a remarkable table mountain, topped on each side by a lofty spire. On the south side of the island there are some islets of volcanic rock which have been named from their respective forms, Obelisk and Flat island. Off the N.E. point are two barren islets, with a dangerous boat passage inside them. Northward of these islets, at a distance of from 1½ to 2 miles, the depth is from 17 to 23 fathoms, sand bottom. The western side of the island abounds in populous villages and there are several convenient anchorages.

Hakahe tau.—This port lies on the north side of the island directly under the western peak, and affords a fairly good anchorage with winds from north-east to south. Approaching from the eastward; the palms around the huts, the red rocks on the eastern side, the reddish islet in the bay, and the hut on the west point of the bay are good marks. Further eastward is a red cliff with a cavern.

Landing is easy at a natural rocky mole, at the mouth of a small river.*

Vaieo bay, situated southward of the N.W. point of the island, is wide, but not deep. With the usual easterly winds there is perfect shelter and good anchorage in 11 fathoms, but of course untenable with westerly winds.*

The best anchorage for large vessels is with the following bearings:—North point of bay, N. 45° W.; middle of the N.E. bight, N. 29° E.; sugar-loaf, S. 2° E.; small craft can go further in to the north-eastward and anchor in 8 or 9 fathoms.

Southward of this bay is the small bight of Akaoto, where small craft can find temporary shelter.

From Vaieo bay the coast trends to the south-eastward for about 5 miles, past the bights of Hakamaii, Apateki and Hikea, in which vessels may find temporary anchorage in fine weather. It is generally calm, with occasional squalls, along the whole west coast, so that sailing vessels find some difficulty in reaching the places they intend visiting.†

Akatau or Bay of Friends, at the S.W. point of the island, affords fairly good anchorage; but there are often heavy gusts from the S.E. and always a somewhat heavy swell. To the southward is a remarkable sugar-loaf rock, called the Obelisk. The anchorage is in the second bight to the northward of this rock, and may be recognised by the native huts, and a small chapel in the southern part of the bight.

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* *See* plan on Admiralty chart, No. 1640.

† Paris Notice Hydrographique, No. 30 of 1882.

At this point of the island the wind is generally south, blowing on shore; sailing vessels should therefore anchor abreast the bight, halfway between the two rocky points, so as to be able to leave at any time. Steam vessels can go rather farther into the bay.

Landing may be obtained on the rocks to the right of the shingle beach, but with some difficulty.

The weather side of the island trends to the northward for about 5 miles to the N.E. point, passing in succession the bays of Hohoi, Paumea, and Hakamui, fully exposed to the trade wind, without anchorage, and where the landing is very difficult.*

Hakahau bay.—From the N.E. point the coast of Ua-pu trends to the W.N.W. for about 4 miles. The second bight from the point is Hakahau bay, where the Roman Catholic missionaries have their principal establishment. The anchorage is bad (coral bottom) and should only be used in cases of absolute necessity. Landing may be effected on a sand beach in the S.E. part, but generally with difficulty on account of the surf.

From the offing, neither the native huts nor the mission buildings are visible as they are concealed by the trees. In communicating with the shore, vessels should heave to well to windward as the current soon drifts them to the westward.

Coast.—Near the North point is a flat islet, between which and the shore the current sets to the westward with considerable strength, this vicinity should therefore be avoided.

Westward of the islet the general direction of the coast is S.W. by W., first forming two unequal bights, with sand beaches at their heads, and separated by a massive point of rocks. The easternmost bight is that of Aneau.*

Aneau bay.—The entrance to this bay is wide, but divided by a reddish rock on which the sea always breaks. In choosing the eastern passage, care should be taken to keep close to the eastern shore, half a cable from which not less than 6½ fathoms will be obtained. In 1876 the French despatch vessel *Le Vaudreuil* obtained 4 and 5 fathoms in the middle of the pass, and then 6½ fathoms immediately after passing the rock.

The western pass is much wider and deeper (11 fathoms almost everywhere) and is preferable for steam vessels. In the inner part of the bay, the sea is smooth with winds between S.E. and E.N.E., but the swell enters more or less; however the anchorage is not very good, and unless compelled by necessity, large vessels do better not to pass the night there. Anchorage may be obtained in the eastern part of the bay in 6½ fathoms, but is better to the S.S.W. of the rock in the pass; the swell may be heavier, perhaps, but there is more room for swinging, and it is easier to get out under sail. Landing may generally be effected without difficulty in the N.E. part of the bay.*

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* Paris Notice Hydrographique, No. 30 of 1882.

UA-HUKA or WASHINGTON ISLAND is 7½ miles long, east and west, and about 5 miles broad. On the south side there are two bights in which anchorage may be obtained, the principal one is named Hannay bay.

The west side of the island appears most fruitful, and off the S.W. end is situated Shavay bay.

Shavay bay.—Off the S.W. point of the island is Height islet, or Hemeni, conical in shape and about 1½ miles in circumference; and inside it a smaller islet called Hat islet, or Téuaua, both of which are covered with sea birds. To the northward of these islets is an anchorage called Shavay bay, which affords good shelter with winds from North to S.E. Vessels are protected from the swell by the islets, and the depth is moderate (11 to 16 fathoms).†

Anchorage may be obtained anywhere between Height islet and a sand-beach on Ua-Huka; but vessels are cautioned not to anchor to the eastward of Height islet as the bottom is said to be rocky and uneven there.

In 1880, the French gunboat *Chasseur* anchored in 13 fathoms with the following bearings: centre of Height islet, S. 13° E.; centre of Hat islet, S. 60° E.; East point of bay, East. The only inconvenience of this anchorage is, that it is nearly 3 miles from the nearest inhabited part, which is Invisible or Vaitake bay.*

Invisible or Vaitake bay is very appropriately so called, as, not until right opposite the entrance can it be recognised, and the sand-beach at the head of the bay made out.

A short distance eastward of the two islets which form the S.W. anchorage is a black cape about the same height as Height islet, and which at a distance has the appearance of an islet in the shape of a wedge inclined towards the land. A little further to the eastward, between two black cliffs, is Invisible bay, which lies in a N.N.W. and S.S.E. direction.

At the entrance, which is very narrow, there is always a heavy, choppy sea. Only small sailing vessels can frequent this bay, although there is water enough for large ships (17 fathoms at the entrance). Small steamers might enter and moor across, but there is no room for swinging.

With winds from North to East the sea is perfectly calm inside the bay;

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* Paris Notice Hydrographique, No. 30 of 1882.

† *See* plan on sheet No. 1640.

but as soon as the wind gets to the southward of E.S.E. the surf sets in between the two black cliffs, and the place is untenable.

The land breeze is not regular, which makes it difficult for sailing vessels to get out.

At the head of the bay is a small beach, with cocoanut trees, and the houses of the Europeans who have settled there. In the eastern part is a small river, at the mouth of which landing may easily be effected in fine weather.

A little to the eastward of Vaitake is a small uninhabited bay, in front of which is a large flat rock, resembling a breakwater; then comes a large bluff with a reddish horizontal band across it at two-thirds of its height. All this part of the coast is rugged, and studded with rocks and islets; among the latter is a red islet, the sides of which are perpendicular, and the upper part a plane inclined towards the land.*

Hannay bay may be known by Motu Haané, a high sugar loaf islet, 508 feet high, situated on the eastern side, which cannot be mistaken on account of the dark violet colour of the rocks.†

The anchorage is in 17 fathoms, with the islet bearing East.

Outside the above anchorages, and all round the island, there is said to be depths of 22 to 25 fathoms at distances varying between a half and 2 miles from the shore.

Off the north coast are several small detached rocks.

Population.—The population of Ua-Huka island was estimated at 260 in 1880.

NUKUHIVA or MARCHAND ISLAND, the principal island of the Marquesas archipelago, is 14 miles in length from east to west and 10 miles broad. It has been frequently visited and described, and the inhabitants are perhaps the best known of any in the archipelago. Full details of their manner and customs may be read with interest in the 9th chapter of Krusenstern's account of the voyage of the *Nadeshda* and *Neva*, 1800–4. The south coast contains the principal places of resort and best anchorage. It consists of lofty, rugged rocks, very steep towards the sea, and from which numerous cascades are precipitated; amongst which, one at the southern end of the island is particularly remarkable. The bed of this waterfall appears to be several fathoms wide, and the water precipitated from a rock over 2,000 feet high. This cascade forms the river, which empties itself into port Tai-oa.

The chain of rocks composing the south coast is connected with the interior of the island, but westward of the southern point the coast is lower and flatter, and rises gradually towards the centre.

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* Paris Notice Hydrographique, No. 20 of 1882.

† *See* plan on sheet No. 1640.

On the south side are three harbours, where ships may lie in perfect safety, named respectively, Comptroller bay, Anna Maria bay, and port Tai-oa. Between the two latter are two bights or bays, which however do not afford anchorage, being full of rocks and exposed to the wind. This south coast of Nukuhiva may be approached within a mile, there being a depth of from 35 to 50 fathoms, over a fine sandy bottom.

The island of Nukahiva offers great resources for cultivation, for the valleys are broad, well-watered, and possess rich soil; tropical fruits abound as in the other islands, but the guava, recently introduced, is fast overrunning the land, and destroying the bread-fruit and many other valuable trees. In 1864–65, the small pox raged here with great virulence, and carried off all but a few hundreds of the natives; in the Happaa and Taipi valleys, where the population numbered nearly 2,000, only about 150 are left. These valleys have been purchased by an English land company, but as yet no steps have been taken to people or cultivate them.*

The total number of inhabitants in Nukuhiva in 1880 was estimated at 800.

Cape Martin or Tikapo is the south-east point of Nukuhiva, and is very abrupt, being capped by masses of rock in the form of a tower, which, when seen from the south-westward, appears to incline towards the sea.

The Te-oho-tè-kea or Sail rock, which lies 600 yards south of the cape, may be taken for a boat under sail, when standing out against the sky.

Comptroller bay, immediately westward of cape Martin, is about 2 miles across, and divided at the head into three coves, which run in a N.N.W. direction. Vessels generally anchor in these coves, as outside them the swell is heavy and the depth from 26 to 30 fathoms.†

Huumi is the easternmost cove, in which the sea is usually calm and landing easy on the sand.

Hanga Haa, the middle cove, runs in more than 2 miles, and the best anchorage is a little northward of the bluff point which separates it from the next bight to the westward.

This latter is divided in two, in the northernmost of which a small vessel may anchor.

All these anchorages are sometimes difficult to reach on account of the wind falling, though as a rule the winds in the interior of the bay blow in the same direction as those outside, inclining to the south-eastward, at the entrance of the two western coves.

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* Captain R. A. Powell, H.M.S. *Topaze*, 1867.

† *See* plan on Admiralty chart, No. 1640.

The currents near Sail rock, and at the entrance to the bay, are variable, and sometimes run to the eastward, but generally follow the direction of the trade wind.

Anna Maria or Taï-o-haé bay is situated about 5 miles westward of Comptroller bay and may be known by the islands—very appropriately named the Sentinels—on each side of the entrance. It may be easily seen whether the wind blows into the bay, and if so, vessels are advised to go in at once. Care is necessary both in entering and leaving not to approach the western shore too closely, as an easterly wind and pretty strong westerly current render the lee shore dangerous.[*]

With a steady fresh breeze in the bay the entrance is perfectly safe, but with a moderate and unsteady wind, such as usually prevails in the bay owing to the lofty surrounding mountains, no reliance must be placed on these unsettled breezes, which veer in one moment from east to west, now coming in violent gusts and immediately after falling perfectly calm. Under these circumstances it is necessary for a sailing vessel to warp in or out, and this is the only method to be depended on.

The east side of the bay has a decided advantage over the western for anchoring, the currents not having the same effect on the ship and the cables consequently being less liable to foul.

Vessels are recommended to moor here, with the swivel, however short their stay, as the sudden puffs and shifts of wind (especially during the night) are almost sure to cause a foul anchor and the ship to drag, and instances are known of vessels having been detained some hours to clear their anchors.[†]

The French have reduced their establishment here to a resident, four soldiers, and a captain of the port, who also acts as pilot; the French authorities insist upon vessels taking the pilot, although he cannot possibly be of any service, as the only difficulties to contend with are baffling winds. The payments amount to 200 francs going in, and the same sum on leaving, and this charge has effectually kept out whalers that formerly were accustomed to frequent the bay.

Supplies.—Good beef, vegetables, and bread can be obtained at fair prices. Water can be obtained from a stream on the west side of the bay, but with difficulty, owing to the boats being anchored well outside the surf, and the engine and hoses having to be sent well up the stream.

Landing.—A stone mole, about 130 feet in length, and prolonged by a wooden part 148 feet long, has been constructed to the northward of fort Collet. Except when eddies occur, small craft can go alongside the end of the mole without difficulty; the latter is indicated by night by a green light, which renders it easily distinguishable.

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[*] *See* plan on Admiralty chart, No. 1640.

[†] Commander K. H. A. Mainwaring, H.M.S. *Cameleon*, 1873.

[‡] Captain R. A. Powell, H.M.S. *Topaze*, 1867.

Coal.—There is a coal depôt belonging to the French government at Taï-o-haé, but the shipment is troublesome and takes a long time. It is brought alongside by two small lighters, which scarcely carry 5 tons, and belong to Mr. Hart, an English trader. These lighters are loaded by the natives, in the small bay between the mole and fort Collet.*

Tides.—It is high water at full and change at 3h. 50m.; rise of tide 4 ft. 6 in.

Port Tai-oa lies to the westward of Anna Maria bay. At the entrance of the bay, the west side of which is formed by lofty and perpendicular rocks, there is 20 fathoms water over a fine bottom of sand and clay. On the eastern side of the entrance is a rocky bay with a heavy surf, exposed to the westward.†

After passing the western point of this rocky bay, a fine basin opens out, running in a north-easterly direction about half a mile deep and 2 cables wide; at the bottom is a sandy beach, behind which is a green flat. This basin is so completely landlocked that the most violent storm would have scarcely any effect on the water, and a ship in need of repairs could not wish a finer harbour for such a purpose, the depth also is exceedingly convenient.

Bananas, cocoanuts, and bread fruit are abundant, but animal provisions are scarce.

Coast.—The western or leeward coast of Nukuhiva is called the Henua Ataha, or desert land, and instead of being steep and abrupt, slopes gradually up to the mountains. The natives come here to fish, but there is no harbour.

It will be prudent to avoid this coast in a sailing ship, on account of the calms, which extend for 2 or 3 miles off shore, caused by the high lands.

The east coast of the island runs northward from cape Martin to Adam and Eve point, a distance of 9 miles, and for one third of the distance is almost perpendicular cliff.

Adam and Eve point or Atupa-atua is the north-east point of the island; on the extremity and at two thirds of its height are two singular rocks, which seen in some positions, look like grotesque statues of a man and woman, hence the name. By the English and Americans they are called Jack and Jane.

The currents run very rapidly round this point.

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* Paris Notice Hydrographique, No. 30 of 1882.

† *See* plan on Admiralty chart, No. 1,640.

The north coast runs generally east and west for 13 miles, and is indented by several bays, some of which are deep, but in the season of the N.E. winds, which veer to the northward, there is a heavy sea in them.

Hataïvea, a narrow indentation only fit for boats, runs in first to the westward of Adam and Eve point. Off the west entrance point is Motu-iti, a pointed rock, which also marks the entrance to Anaho, the next bay.

Anaho bay forms a good anchorage, and is perhaps the best harbour in the Marquesas islands, being the only one where vessels do not generally roll. The bay is about 1¼ miles in a north and south direction, and the bottom on the west side is obstructed by a coral reef which dries in patches at low water.*

With winds from S.E. to E.N.E. the sea is perfectly calm, but when from N.E. the surf is sometimes felt a little. In 1880 the French gunboat *Chasseur* scarcely felt anything at the anchorage when the wind was blowing fresh from the N.E. outside.

Sailing vessels have no difficulty in entering the bay, and in moderate weather it is just as easy to get out. The water is nowhere very deep, and in cases of necessity vessels can anchor anywhere. Formerly this bay was much used by whalers.

The head of the bay is very close to that of Aa-tua-tua on the east coast, being only separated by a narrow isthmus.

Anchorage.—The best anchorage for sailing vessels is on the eastern side of the bay opposite the Blow Hole in 15 fathoms. Steamers prefer anchoring near the western anchor marked on the chart on account of being nearer the landing place. They should avoid going deeper in to the westward, and should keep the entrance of the bay well open.

Landing can be effected without difficulty on the beach by passing through an opening in the reef opposite some huts on the shore, as the water is always smooth there.

Caution.—Sailing vessels in leaving the bay should study the current, which sets rather strongly to the westward. In sailing from the eastern anchorage they may find a difficulty in weathering Mésange point, notwithstanding the E.S.E. squalls coming over the isthmus from Aa-tua-tua.†

Atiheu bay.—The eastern extremity of this bay, which is the third from Adam and Eve point, is about 5 miles from that cape, and may be recognised by a bluff of brown rocks, over which towers a peak 980 feet high. The east point is 246 feet high, and vessels can go close alongside as there is 16 fathoms at the foot. The west side of the bay is terminated by a comparatively low point.

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* *See* plan on Admiralty chart, No. 1640.

† Paris Notice Hydrographique, No. 30 of 1882.

Coming from the northward or westward the residence of the Roman Catholic missionary will be seen at the entrance of Atiheu bay, a white house somewhat elevated above the sea.

To find a convenient anchorage vessels should proceed about a mile into the bay, which is nearly 1½ miles deep from the east point, up to which there is no bottom at 27 fathoms. In many places opposite the points which project from the eastern side the bottom is rocky for some distance from the shore.

Anchorage.—The best anchorage is opposite a small bight situated in the S.E. part of the bay in 12 fathoms, sand, with the following bearings:—West point of the bay, N. 50° W.; mission house, N. 5° W.; east point of entrance, North.

Violent squalls from S.E. sometimes occur which blow down the steep mountains in the inner part of the bay. During the season of the N.E. winds the sea is sometimes very heavy and nearly always rough. At any time it is difficult to beat out on account of the variableness of the squalls.

Landing on the beach in the N.E. season is difficult, if not impossible; but with proper precautions may generally be effected on the rocks in the S.E. part of the bay opposite the anchorage.*

Haume bay is a slight indentation of the coast just west of Atiheu, and is not inhabited.

Hakapa bay is an almost semi-circular indentation about 7½ miles westward of Adam and Eve point, and exposed to all winds from E.N.E. to N.W., without anchorage, and no landing on account of the large boulders on the beach. The corresponding valley is densely wooded, and the native huts may be seen among the trees half way up the hill at the foot of very steep mountains.*

Hapapani and Vaekao bays.—To the westward of Hakapa is a bight in which are two very small bays, Hapapani lying N.W. and S.E., and Vaekao N.N.E. and S.S.W. Several vessels have anchored in the former during the S.E. winds.

Hakaehau bay.—From Vaekao, the coast instead of being a continuation of abrupt cliffs, descends in gentle slopes towards the sea, the beginning of the desert land. Westward of the second point from Vaekao is Hakaehau bay, inhabited by the tribe of Pua. It is difficult to distinguish, but the eastern part of the highest mountain in the island bearing S.E. leads to the entrance.

The eastern point of the bay is a promontory of black rocks, which sailing vessels should pass close to in coming to an anchor.

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* Paris Notice Hydrographique, No. 30 of 1882.

Hakaehau is a small basin about 4 cables deep and less than 2¾ cables wide, lying in a N.W. and S.E. direction and well sheltered from the ordinary winds. While the French war vessel *Chasseur* was in this anchorage there was a good breeze blowing from E.N.E. and a heavy sea outside, but quite calm in the bay. The only winds to be feared are those from N.W.

In the middle of the bay is 8½ fathoms, gray sand, the depth gradually increasing to seaward. One mile northward of the east point are 22 to 26 fathoms, gray sand; so that in fine, calm weather sailing vessels can kedge out and make sail. The land breezes from E.S.E to S.E. are generally felt in the morning.

Formerly a good many whalers visited Hakaehau, but most of them anchored at the entrance of the bay.*

Motu-hi is a small bay about one mile to the westward of Hakaehau, but does not afford anchorage.

HERGEST ROCK or MOTU-ITI is a volcanic rock elevated 130 feet above the sea, situated 24 miles W. by N. of the N.W. point of Nukuhiva. To the eastward are two other white islets entirely devoid of vegetation, and much lower than Hergest rock.

There is an abundance of fish round them, and large flocks of gulls, which have left a considerable deposit of guano, but of bad quality.

LAWSON BANK.—Mr. Lawson, master and owner of the trading sloop *Peep-o'-day*, reported that on May 2nd, 1863, he passed over a bank of considerable extent on which he hove to and obtained soundings of 8, 10, and 12 fathoms; also caught several large fish of the rock-cod species. On first seeing the bottom, Hergest rocks bore E. by N. about 10 or 12 miles.

In 1870 an American whaler crossed the bank, and a report to that effect appeared in a Sandwich island newspaper.

In March 1871, Captain Turner, in the schooner *Nautilus*, passed over this bank, obtaining soundings of 4 to 10 fathoms, Hergest rocks bearing E.N.E. 7 or 8 miles.†

CLARK BANK was first reported in lat. 8° 18′ S., long. 139° 52′ W. The French war vessel *Venus* sounded near this position, and failed to obtain bottom at 176 fathoms. This bank, however, has been clearly seen by several ships, and Captain Turner of the whaler *Spartan* crossed the bank in 1855, obtaining 8½ fathoms least depth of water, though shoaler patches were apparently seen from aloft.

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* Paris Notice Hydrographique, No. 30 of 1882.

† Commander K. H. A. Mainwaring, H.M.S. *Cameleon*, 1873.

In 1869 Captain Turner, of the schooner *Nautilus*, reports having found himself suddenly in shoal water. He sailed over the bank from north to south, piloting the vessel from the masthead in the deep channel for 2 or 3 miles; the least water obtained was 6 fathoms, but shoaler patches were seen near the ship. He places the shoal in lat. 8° 8′ S., long. 139° 53′ W.

In 1875, the French war vessel *l'Infernet* searched over this latter position without success, no bottom being obtained at 164 fathoms.

The position of Clark bank is therefore marked "doubtful" on the Admiralty chart.

EIAO or MASSE ISLAND is 6 miles in length in a N.E. and S.W. direction, and attains a height of 2,000 feet. The south shores are rocky, without any coves or landing places, the surface, though green, produces no trees, but a few shrubs and bushes are thinly scattered over the face of the rocks. The north-west side has a more favourable aspect, and although the shores are rocky, a number of trees are produced both on the sides of the hills and in the valleys. This side possesses some coves where there is landing, particularly in one near the middle; this from the appearance of the northern side is named Battery cove. A little to the northward of this cove is a bay called Cocoanut bay, which was examined by Lieutenant Hergest, and good anchorage with regular soundings from 5 to 18 fathoms found, the bottom a fine clear sand.

An excellent stream of fresh water discharges into the bay, near a grove of cocoanut trees. The landing was but indifferent on account of the surf; but water is easily obtained.

In the two valleys above alluded to the vegetation seemed more rich and active than in any other parts of the island. Besides these, between the peaks several plateaux covered with pine trees and verdure were seen. The island is not inhabited.

HATUTU or CHANAL ISLAND is about 4 miles in length and one mile broad and attains a height of 1,380 feet. At the north point there is a large high islet a short distance from the shore.

In the channel separating Hatutu from Eiao, a breaker is reported to exist.

These two islands afford an abundance of fish and sea fowl, and are occasionally resorted to by the natives of Nukuhiva and Ua-pu islands.

CORAL ISLANDS.—Situated 9 miles E. by N. ½ N. from the east end of Hatutu are two coral islands, on a shoal on which the sea breaks heavily. Soundings from 12 to 20 fathoms were obtained in the vicinity, and there are vague reports from whalers of other shoals in the neighbourhood.

SCATTERED ISLANDS NORTH-WEST OF THE MARQUESAS.*

FLINT ISLAND, in lat. 11° 26′ S., long. 151° 48′ W. is 13 feet high, covered with brushwood and trees, and visible from the masthead from a distance of 16 miles. The island is about 2½ miles long from N.N.W. to S.S.E., half a mile broad in the widest part, and fringed by a steep coral reef which dries at low water, and extends seaward half a cable; off the north end of the island the reef extends seaward nearly half a mile, and off the south end E.S.E. a quarter of a mile. In the interior of the island are two lagoons having brackish water.†

The European settlement is situated near the landing-place on the west side of the island. A mooring buoy is placed in 95 fathoms water off the landing-place; the anchor is secured by a chain to an inner buoy situated close to the shore, and the inner buoy is secured by chains to the shore. Vessels are recommended during easterly winds to make fast a hawser also to the inner buoy.‡

Guano has been shipped at the island.

In October 1880 the island was uninhabited, and the buoys were gone.§

There is little or no rise and fall of tide.

VOSTOK ISLAND (*English*), about 86 miles N.N.W. ½ W. of Flint island, in lat. 10° 6′ S., long. 152° 23′ W., is somewhat triangular in shape and about a third of a mile in diameter. This low sandy island is thickly wooded, about 80 feet in height to the tops of the trees, surrounded with heavy breakers, and visible from the masthead from a distance of about 13 miles.‡

Landing may be effected on the western side, through a boat passage in the reef opposite the place marked settlement on the chart. In 1884 it was uninhabited.‖

CAROLINE ISLAND, lying about 123 miles E. by N. of Vostok island, consists of a number of small islands, standing on a coral reef. The chain of islands thus formed is about 7 miles long in a N.N.E. and S.S.W. direction, 1½ miles broad, from 15 to 20 feet high, and may be seen from the masthead from a distance of about 14 miles. The enclosing reef fringes the shore, and on the outer edge the sea breaks with considerable violence. There is a passage through or over this reef near the south-west point, which is deep enough to permit ships boats to penetrate to the lagoon at high water.‡

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* *See* Admiralty charts.—Pacific Ocean, General No. 2683. Pacific Ocean, S.E., sheet No. 783. Pacific Ocean, N.E., sheet, No. 782.

† Berlin Annalen der Hydrographie, Heft 1 of 1878.

‡ *See* Admiralty sheet of plans, No. 979.

§ Remark book, Navigating Lieutenant W. Turner, H.M.S. *Pelican*, 1880.

‖ Captain F. P. Doughty, H.M.S. *Constance*, 1884.

This island was visited in May 1883, by the U.S.S. *Hartford*, for the purpose of observing the total eclipse of the sun. The transit pier which was used on the occasion is situated near the northern point of South island, and is crowned with a marble slab bearing the following inscription :—"U.S. Solar Eclipse Party, May 6th, 1883." The position of the pier is in lat. 10° 0′ 1″ S., long. 150° 14′ 30″ W.

Directions.—Vessels intending to visit Caroline island should pass to the south-westward or lee side of the atoll, and sight the flagstaff standing among the trees, near the transit pier. The flagstaff may be easily distinguished, and in the daytime an English ensign will probably be hoisted as the vessel nears the land. When the flagstaff bears S.E. by E. if the vessel stands close to the reef, which is bold, the boat landing may be distinguished near the fluke of an anchor, just inside the surf on the reef.*

The passage is formed by an indentation in the reef, about 50 feet deep, into which the boat must be pulled on the back of a roller. A sheer to port should be given to the boat when within the indentation to avoid some projecting coral rocks on the starboard hand, when this is passed a landing may be made on the flat coral reef. The reef does not dry at low water.

Inhabitants.—The island was inhabited in 1884 by five Tahitian natives, who were engaged in the planting and care of cocoanut trees.

Supplies.—Several varieties of birds abound, curlew, plover, &c., and a few fowls. Fish are abundant and in great variety.

Water.—The source of fresh water is the rains, which filter through the sand and collect on the coral rock. There are two shallow wells on the southern island and one on the northern island.

Climate.—The climate, though warm, is pleasant, and the temperature equable. The weather, though mostly fine, is changeable, occasional sudden showers occurring, generally at night or early in the morning.

Winds.—The prevailing winds in April and May are from the northward and eastward.

In 1878 a cyclone passed over the island destroying most of the cocoanut palms.

Tides.—For the outer reef it is high water, full and change, at 4 hours ; springs rise 1 ft. 7 in., neaps rise 5 inches.

Observations show no relation between the tides in the lagoon and those outside. The lagoon is open to windward, and the tides are evidently much affected by the wind.

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* Caroline island was taken possession of in the name of Her Majesty the Queen, by Commander E. Nares, H.M.S. *Reindeer*, on the 9th July 1868.

PENRHYN ISLAND, situated about 325 miles W. ½ N. of Vostok island, consists of numerous low islets, about 50 feet high to the tops of the trees, connected by reefs surrounding a lagoon, which is said to be deep and to have many coral heads; the whole island is about 12 miles long and 7 miles broad. All the islets are covered with cocoanut trees, many however without heads, which would indicate that a cyclone has swept over the islands.*

There is a bank off the N.W. point, extending about 1½ miles to the north-westward, with from 7 to 9 fathoms, though shoaler water may exist; anchorage might be obtained on this bank if necessary, but in a very exposed position.

There are three passages into the lagoon, the best of which is on the west side, in lat. 9° 0′ S., long. 158° 3′ 25″ W., near the settlement; there is only 2¼ fathoms over the bar, deepening quickly inside; and a depth of 10 fathoms one cable outside the entrance which increases quickly. Another entrance near the N.W. point has 4 fathoms of water, but the channel is intricate and in one part excessively narrow. The third passage, on the N.E. side, carries a depth of 2½ fathoms and is used by small craft trading to the settlement, who leave by the western passage.†

A dangerous reef is reported to exist about 4 miles off the east side of the island, on which the natives occasionally fish.

In 1884 there were 3 Europeans settled on the island, and 370 natives, who appeared to have come from different islands as their caste of features was very varied. They have missionaries among them and profess Christianity (protestantism).

The principal occupation is in collecting the pearl shells. Fish and cocoanuts can be obtained in abundance.

Tides.—It is high water at full and change about 6 hrs.; rise 1½ feet.

STARBUCK ISLAND, situated 235 miles N.N.E. of Penrhyn island, is 5½ miles long in an east and west direction, and 1½ miles broad. The island is very low, for the most part white coral sand, with green tangle and ice weed, and a few shrubs in the north-east part, which render it visible from the masthead from a distance of about 11 miles.*

Near the west point of the island is a large pyramid-shaped wooden beacon, which is almost the first object seen from seaward.

Starbuck is surrounded by a reef extending half a mile from the shore, except on the east side where it extends further. The north and north-west points are the only places where landing can be effected, here there are passages through the reef, but landing is difficult and dangerous at all times.

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* *See* Admiralty sheet of plans, No. 979.

† Remark book, Lieutenant E. Fleet, H.M.S. *Gannet*, 1881.

The place has been visited for guano, then abandoned, but subsequently revisited by the company working Malden island.

In 1884, the island was deserted, and houses, pier, and a cargo boat looked irrepairable.*

Near the N.W. point, close to the shore, the depth is 15 fathoms, and 85 yards further out, the descent is from 15 to 130 fathoms and upwards; anchorage off the south side is wholly impracticable.

Starbuck island was taken possession of, in the name of Her Majesty the Queen, by Commander Swinbourne H.M.S. *Mutine* in December 1866.

The west point is in lat. 5° 37′ S., long. 155° 56′ W. as determined by the officers of the French transport *Euryale*, which vessel was lost on the island on the night of March 4th, 1870.

Current.—On the occasion of the loss of the *Euryale*, the current was found to have set 50 miles, W. by N. ½ N., in 24 hours.

MALDEN ISLAND, (English), lying about 106 miles N.N.E. of Starbuck island, is a low coral island about 5 miles long and 4 broad, and in no place more than 30 feet above the level of the sea; a few shrubs and marine plants grow on the island, which render it visible from the masthead from a distance of about 15 miles, but no fresh water is to be found; repeated attempts having been made to obtain it by sinking wells. There is a condensing machine for distilling water at the settlement. There are several salt lagoons (one of large size), the waters of which ebb and flow with the ocean tide. Indications of former inhabitants exist.†

The island is steep-to, with but an indifferent anchorage on the lee or western side; but is worked for the guano by a Melbourne company, who have a boat pier run out under sheers, from which the cargo boats are loaded.

Several sets of moorings are laid down off the western side of the island the buoys of which are about a cable apart north and south; but so close to the shore as to render the utmost caution necessary when approaching under sail, especially as the current generally runs strong to the southward. It is advisable to keep some after sail set aback when at the moorings, to prevent tailing on the reef should the wind fall light, or else to drop a small stern anchor in about 60 fathoms.

A small ledge extends a short distance from the shore just to the southward of the pier, on which a vessel struck on casting from the buoy, and became a wreck. Care is therefore necessary in giving this ledge a wide berth as the current sets right across it.‡

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* Captain F. P. Doughty, H.M.S. *Constance*, 1884.

† *See* Admiralty sheet of plans, No. 979.

‡ Remark book, Lieutenant Ernest Fleet, H.M.S. *Gannet*, 1881.

Landing is effected at the loading pier or on the beach when the surf permits. There is a five-mile tramway which brings the guano in from distant parts dead to windward; the trucks are pushed up by hand in the morning and sail back as they are loaded. Houses, stores, carpenters and blacksmiths' shops, tram-pier, boats, &c. are in good order.

In 1884 there were 8 Europeans and 160 native labourers on the island working the guano.*

The flagstaff on the west side of the island is in lat. 4° 3′ S., long. 155° 1′ W.

Current.—A strong westerly current must be taken into consideration, when navigating in the vicinity. Lieutenant Chauviniere considers that the approach to Malden and Starbuck islands, especially from the eastward, must be made with great caution, owing to much of the shore being awash and to the prolongation of the reefs in that direction. The currents also run very strongly between Malden and Starbuck, running to the westward 32 miles in 24 hours; and in the vicinity of the latter island has been estimated to run 43, 51, and even 56 miles W.S.W. in 24 hours.

JARVIS ISLAND, about 365 miles N.W. by W. ½ W. of Malden island, is a small coral island, triangular in shape, 1¾ miles east and west, and a mile north and south, exhibiting the appearance of a white sandy beach, 10 or 12 feet above the sea, without trees or shrubs, except one young cocoa-nut tree, and but a few patches of grass. The island has been occupied by the Phœnix Guano Company, who placed men on it for the purpose of working the guano.

During the day, the houses will be first observed on nearing the island; but at night time the white sandy beach is the most conspicuous.

The island may be seen from the masthead from a distance of about 14 miles.

In 1880 there were five houses on the island in charge of a Tahitian, and the American flag hoisted, as Captain E. O. Avery had taken possession of Jarvis island in February 1880, and placed it under the protection of the Government of the United States.† However in 1881, on the occasion of the visit of H.M.S. *Gannet*, the Red ensign was observed to be flying.‡

In 1884, when H.M.S. *Constance* visited the island, it was deserted, and from an old almanac that was found it appeared to have been abandoned in October 1882.*

A shoal bank extends for about a mile from the north-east side of the island, on which the least water obtained was 5 fathoms.*

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* Captain F. P. Doughty, H.M.S. *Constance*, 1884.

† Remark book, Commander F. R. Dicken, H.M.S. *Pelican*, 1880.

‡ Remark book, Lieutenant Ernest Fleet, H.M.S. *Gannet*, 1881.

Captain Wilkes of the U.S. exploring expedition places the island in lat. 0° 22½′ S., long. 159° 54′ W.

CHRISTMAS ISLAND, about 200 miles N.E. ½ N. of Jarvis island, is one of the largest of the coral islands, being nearly 30 miles long in an east and west direction; the highest part does not exceed 3 or 4 feet, and is not visible for more than 5 or 6 miles from a vessel's deck, the haze of the breakers being often seen before the land, this, together with the strong currents which set west and north-west, particularly during the full and change of the moon, render the east side of the island extremely dangerous, and many wrecks have occurred upon it.*

The bight on the east side is very dangerous. A vessel getting into it at night will have great difficulty in getting out after discovering the breakers.

On the west side of the island is a rather deep indentation, with a sandy island lying in the centre, forming two narrow and shallow channels into the lagoon; small vessels may enter, but the sea breaking over the low belt of coral makes the anchorage inconvenient.

There is fair anchorage off the sandy island (Cook island) in from 10 to 15 fathoms, about a mile distant, and the water is generally smooth. The tides set strongly in and out of the lagoon, but are not much felt at the outer anchorage.†

The best anchorage is stated to be in 10 or 15 fathoms water, sandy bottom, midway between Cook island and the north-west point of Christmas island, and just off a reef, over which the surf breaks constantly. This anchorage is smooth when the trades are blowing, but if the wind is to the southward of south-east, or to the northward of north-east, there will be a heavy swell setting round the points.

The winds are generally from the eastward, with an occasional squall from the northward or southward; rain squalls during the night are frequently experienced near the time of full moon.

Fish are plentiful, of excellent quality, and easily caught by heaving a line a few feet from the beach at high water. A few turtle have been seen, and they may be plentiful in the season. Sharks are numerous and give much trouble to the shell divers.

An inferior quality of fresh water has been found by digging, which answers for cooking purposes, and would sustain life for a short time. The wood of the bushes growing on the island is extremely soft and spongy, and of little value; the cocoa-nut trees of which Cook, Scott, and others speak, have nearly all disappeared, there being but eight standing on the island in 1881; wrecked parties have cut many of them down, the remainder being destroyed by the wind.

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* *See* Admiralty sheet of plans, No. 979.

† Commander J. S. Skerret, U.S.S. *Portsmouth*, 1874.

In 1880 a notice was found in the house on Bridges point that the island had been leased from the British government by Houlder Bros. & Co. of London.*

In 1884, the island was owned by Messrs. Henderson and MacFarlane, of Auckland, who had placed one European and 5 native labourers on the island for the purpose of collecting the black-edged pearl shell, and planting large quantities of cocoa-nuts.†

The observation spot on the north end of Cook island is in lat. 1° 57′ 17″ N., long. 157° 27′ 45″ W.

It is high water at full and change at 4h. 23m. Springs rise 3 feet 2 ins.

FANNING ISLAND, about 145 miles N.W. ½ W. of Christmas island, is a low lagoon coral island, thickly covered with cocoa nut trees, which render it visible from a vessels deck at the distance of about 15 miles.‡

The island is not above 2 or 3 feet high in any part except on the northern and eastern sides, where a narrow ridge of coral plates have been thrown up by the sea to the height of 10 feet, forming a kind of breakwater. On the weather side, the island is steep to at a distance of 100 yards outside this breakwater, but to the north-westward and westward a bank of coral extends off from one half to three-quarters of a mile; on the west side whalers anchor in from 10 to 20 fathoms half a mile off shore. The greatest length of the island, which is in a north-west and south-east direction, is 9½ miles, and 4 miles wide.

The width of the belt of coral enclosing the lagoon is about half a mile; there are several gaps in the trees, which appear from seaward like entrances into the lagoon, but are not so, the only entrance being on the south-west side.

The entrance into the lagoon is scarcely a cable in width with a depth of 4 fathoms.

Vessels should not enter without a pilot, who will come off from the settlement on the east side of the entrance, where there is a flag-staff flying the English flag, which is in lat. 3° 51′ 25″ N., long. 159° 22′ 0″ W. This is not a safe place for sailing vessels to enter, unless fore and aft rigged schooners, which may work in with a knowledge of the tides. A steam vessel of 16 to 18 feet draught may enter safely with the beginning or end of the ebb, but she cannot go beyond 2 or 3 cables within the entrance and must moor opposite the houses, in 4 fathoms, in the strength of the tide. The best time for leaving the anchorage is at the beginning or end of flood tide.

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* Remark book, Commander F. R. Dicken, H.M.S. *Pelican*, 1880.

† Captain F. P. Doughty, H.M.S. *Constance*, 1884.

‡ The description of Fanning island is derived from the remarks of Captain G. H. Richards, H.M Surveying ship *Hecate*, 1863. *See* Admiralty sheet of plans, No. 2867.

The lagoon within the entrance is choked with coral bars and patches, which are considered to be growing up, there are some deep places however, and vessels of 12 feet draught may cross the first bar and anchor out of the tide; small vessels may lie alongside the eastern shore out of the tide.

In May 1863 H.M.S. *Hecate* remained eight days moored off the settlement with 40 fathoms on each anchor, and found the tides to run at the rate of 5 knots at springs, the flood stronger than the ebb. It is not a comfortable anchorage, though if properly moored, not unsafe ; there is not sufficient room for two large vessels.*

In 1881 there was a small settlement lately abandoned, 6 cables south of the N.W. point, consisting of a few houses and huts and a long substantial iron pier. There is a small quantity of guano, but only of fair quality.

In 1884, the island was owned by Messrs. Greig and Bicknel, of Honolulu, who had placed 4 Europeans and 21 native labourers on the island for the purpose of working the guano, which was being shipped at Whaler anchorage.†

Directions for entering lagoon.—Steer for flagstaff point on an E.N.E. bearing, until nearly abreast of the ledge of rocks running to the southward from the north point of entrance, when steer so as to pass from 50 to 80 yards distant from the flagstaff point, and moor off the settlement with open hawse to the S.S.E.

During ebb tide there is a strong line of ripples near the centre of the deep water channel, which to a stranger might appear to mark the shoal spit on the north side of the entrance; but a bearing of the flagstaff is the best guide, going either in or out.‡

Winds and weather.—The N.E. and S.E. trades appear here to merge into an easterly wind, which blows during the greater part of the year, perhaps the S.E. trade is dominant; there is rarely a calm. During January, February, and March uncertain weather prevails, and sometimes strong northerly winds, with much rain, also north-westerly gales, when the anchorage would be unsafe for a large vessel.

Water may be procured by digging wells, in which the fresh water rises and falls with the tide ; these wells should not be more than 4 feet deep or the water will be brackish.*

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* Captain G. H. Richards, H.M.S. *Hecate*, 1863.

† Captain F. P. Doughty, H.M.S. *Constance*, 1884.

‡ Remark book, Lieutenant E. Fleet, H.M.S. *Gannet*, 1881.

Tides.—It is high water at full and change at 6h., the greatest rise and fall is 2 ft. 6 in. The tides are 6 hourly and regular, and run as much as 5 knots at springs.

WASHINGTON ISLAND, lying 66 miles N.W. by W. of Fanning island, was discovered by Captain Fanning in 1798. It is 3½ miles in length east and west, by 1¼ miles wide, the height above the sea about 10 feet, and entirely covered with cocoanut and other trees, exhibiting a most luxuriant growth, which render it visible from the masthead from a distance of about 14 miles.

The fringing reef extends half a mile off the eastern point, and off the west point the water appeared much discoloured, but the sea was only seen to break close to the island.*

In approaching this island, every opportunity should be taken of verifying the position of the ship, as being near the southern edge of the counter equatorial current the currents vary both in direction and strength.

There is good anchorage off the settlement at the western end of the island, but landing is dangerous and sometimes impracticable on account of the heavy surf.

In 1884, the island was owned by Messrs. Greig and Bicknel, of Honolulu, and one European and 30 native labourers have been left by them to cultivate cocoa-nuts and cure copra.†

The observation spot, near the village, is in lat. 4° 41′ 10″ N., long. 160° 19′ W.

PALMYRA ISLAND, which was discovered by Captain Sawle of the American ship *Palmyra* in 1802, was surveyed by Commander J. S. Skerret, commanding the U.S.S. *Portsmouth*, in 1874, and consists of many small islets occupying a space of 5 miles east and west and one mile north and south, situated about 126 miles N.W. by W. ½ W. of Washington island. The several islets, which enclose three distinct lagoons, are low, the most elevated being only 6 feet above the level of the sea, and covered with cocoanut trees. From a distance the islets appear as a group surrounding a single lagoon. The position of the observation spot, near the south-western islet, is in lat. 5° 49′ 4″ N., long. 162° 11′ 30″ W.‡

Breakers extend a mile from the north-east and south-east islets; and on the north side of the group the sea sometimes breaks in 5 fathoms. On the eastern side the current combined with fresh easterly winds creates an overfall, but there is no known danger outside the breakers on the eastern side.

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* *See* Admiralty sheet of plans, No. 2867.

† Captain F. P. Doughty, H.M.S. *Constance*, 1884.

‡ *See* Admiralty sheet of plans, No. 979.

Anchorage.—It is dangerous to approach Palmyra island from the northward or westward; the safest approach is from the southward. A vessel may stand safely in by keeping Strawn island, on which the huts are erected, bearing N.E. by N., and run in until Bird island (the south-eastern island) bears E. by N., when she may anchor in 7 fathoms. The water shoals rapidly from 30 fathoms.

Tides.—It is high water, full and change, at 5h. 23m.; springs rise 2 feet.

Weather.—Mr. Strawn, a resident, stated that during the five months he had been on the island the rain was almost constant, four days of dry weather being the longest interval on any one occasion. There is no evidence that the island is visited by storms, but strong squalls sometimes blow from the east and south-east.

Supplies.—A few people are living on Strawn island (north-west end of the group), engaged in making copra. Fish are abundant and in great variety; turtle scarce; curlew, snipe, and plover were found. On one of the eastern islets there is a small pool that generally contains rain-water.

KINGMAN REEF.—In June 1874 the British steam-ship *Tartar* struck on a coral reef which is considered to be identical with Kingman reef situated in latitude 6° 24′ N., longitude 162° 22′ W. The shoal, none of which showed above water, appeared to be of considerable extent and in the shape of a horseshoe. The vessel was found to be in a lagoon enclosed by a network of coral reefs.

In this locality reefs have been frequently reported, varying but little in position in latitude but considerably in longitude, and it is probable that different positions have been given to the same reef, and that the error has been caused by incorrect reckoning and strong currents. Until this locality has been more thoroughly examined, great precaution should be taken in its navigation.

Kingman reef is situated in the belt traversed by the equatorial counter current setting to the eastward, which current in this part attains a strength of 30 to 42 miles a day.*

CALDEW REEF is reported to be in lat. 6° 24′ N., long. 161° 44′ W., its existence however is doubtful and may be identical with the foregoing.

MARIA SHOAL was reported by Captain Crane of the schooner *Maria* in 1862, the position given being lat. 5° 58′ N., long. 164° 0′ W.

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* *See* Wind and current charts for the Pacific, Atlantic, and Indian oceans, published by the Admiralty, 1872.

The schooner ran over a reef of rocks, with about 4 fathoms water, and discoloured water in the vicinity.

In 1874, Captain Skerrett, U.S.N. reported having searched the position assigned to this shoal without seeing any signs of shoal water.

Captain Cobb of the P.M.S.S. *City of New York* and Captain Dearborn of the P.M.S.S. *City of Sydney*, who have passed the vicinity of this reported shoal, both doubt its existence.*

Captain Chevalier of the steam-ship *Zelandia*, 1878, reported having on two occasions passed over the above position, without seeing any indication of shoal water, the position therefore must be considered doubtful.

DIANA SHOAL was discovered by a schooner of that name in 1852, during her passage from Honolulu to Fanning island. The position given is lat. 8° 40′ N., long. 157° 20′ W. In 1863 H.M.S. *Hecate* searched unsuccessfully for Diana shoal in the above position, but Captain Richards was informed afterwards at Fanning island, by an English trader, that it is well known, and that the shoal is of considerable extent. Its existence must therefore be considered as possible, though it has never been again reported, and its position is very doubtful.

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* United States. Notice to Mariners, No. 175 of 1884.

CHAPTER V.

VARIATION IN 1885.

Sandwich islands - -	8° 0′ to 9° 15′ E.
Midway island - -	10° 15′ E.

HAWAII OR SANDWICH ISLANDS.—ISLANDS, ROCKS, AND SHOALS.

POSITION.—DISCOVERY.—EARTHQUAKES.—NATIVES.—SUPPLIES.—WIND. CURRENTS.—TIDES, &c.

The Sandwich islands, lying between the parallels of 18° 50′ and 22° 15′ N. and the meridians of 154° 40′ and 160° 30′ W., stretching in a W.N.W. and E.S.E. direction for about 340 miles, consist of eight principal islands and four small rocky islets; the entire group having an area of about 6,000 square miles.

These islands were first made generally known to Europeans by the third voyage of Cook in 1778, but it appears probable that they were previously known to the Spaniards, as in some charts, taken by Anson from a Manilla galleon, there is a group of islands called Los Magos, placed between lat. 18° and 22° N. and long. 135° and 139° W., the different members of which are named La Mesa, La Desgraciada, Los Monges, &c.

The Spanish word Mesa, signifying table, probably refers to the island of Hawaii, the summits of which, unlike those of most volcanic islands, are flat; also the position as regards latitude would seem to point to the conclusion that the group is identical with what is now known as the Sandwich islands or Hawaiian archipelago.

On the 18th January 1778 Captain Cook sighted Kauai island, and on the 20th January he anchored in Waimea bay, on the south-west side of the island; he named the group the Sandwich islands in honour of the Earl of Sandwich, the first Lord of the Admiralty.

After visiting the coast of North America, Cook again returned to the Sandwich islands, anchoring at Kealakekua bay, on the west side of Hawaii, on January 17th, 1779.

The natives were found to be friendly and hospitable on this occasion, and on February 4th Cook took his departure, but during a gale on the 8th, the *Resolution* being disabled, the ships returned to Kealakekua bay on the 11th.

On this occasion from some uncertain cause a chief was killed, and several petty thefts being resented, a misunderstanding speedily arose, which led to a conflict with the natives, in which the distinguished navigator was killed on February 14th, 1779.

The vessels left Kealakekua bay on the 22nd, and an examination was made of the group, leaving finally on March 15th, 1779.

The next visitors were Captains Portlock and Dixon in the *King George* and *Queen Charlotte*; they anchored in Kealakekua bay on May 26th, 1786, and left the group in June, and on two subsequent visits at the end of the year, and also in 1787, they called at most of the islands, and were well received by the natives.

It appears that La Perouse was at the Sandwich islands at the same time as Portlock and Dixon; he anchored at Maui island and left on June 1st, 1786.

In 1787 Captain Meares visited the group, remaining a month, and reported very favourably on the disposition of the islanders; and in 1788 and 1789 Meares and Douglas visited the islands, the latter remaining amongst them about four months.

Between the years 1790 and 1795 Vancouver called in on three occasions; in 1793 he introduced cattle and sheep from California, landing them at Hawaii; he also endeavoured to bring to a close the fatal wars then continually raging between the natives of Hawaii and those of the other islands.

In 1794 Kamehameha, the chief of Hawaii, accomplished the subjugation of all the other islands, and when he died in 1819 at the age of 66 he was king of the whole group. He was succeeded by his son Lihò-Liho, during whose reign the first missionaries arrived in the group, sent by a society in the United States.

In 1824 Liho-Liho, in company with his wife, prime minister, and suite, visited England. Unfortunately both he and his wife died in London, whereupon the *Blonde* frigate, under command of Lord Byron, was despatched to convey the rest of the party, with the remains of their king and queen, back to the Sandwich islands.

On the death of Liho-Liho (who on succeeding to the sovereignty of the islands had taken the title of Kamehameha II.) his brother, then 12 years old, was proclaimed king as Kamehameha III., under the regency of his mother, on whose death, in 1833, he assumed the entire government of the islands, Honolulu, in the island of Oahu, becoming the capital.

In 1843 the independence of the group as the Hawaiian Kingdom was acknowledged by Great Britain, France, and the United States.

The whole of the islands composing the Hawaiian archipelago are volcanic and mainly due to the effects of successive eruptions from craters which have been active through long periods of time; whether at any period any of these islands could have been classed among the atolls so common all over the Pacific is unknown, as they have not been very critically examined; well-defined coral has, however, been found at the height of 500 feet in the island of Molokai, and a bed of coral also exists at an elevation of 4,000 feet in Kauai; coral, interstratified with lava beds, is also reported to have been found in some of the other islands.

THE EARTHQUAKES experienced in this group are rarely severe or destructive; the heaviest occur in the district south of Mauna Kea in Hawaii. The sea wave, however, the usual attendant of earthquakes originating near the sea coast, is often very destructive, sweeping away villages and causing great loss of life and property. Of the extinct craters, Punch-bowl hill and Diamond hill in Oahu are well known from being situated near Honolulu, the capital; but the most remarkable and the largest known crater in the world is that of Mauna Hale-a-ka-la, in east Maui, 10,030 feet above the sea. The rim is over 12 miles in circumference and 2 miles wide in its broadest part; it is destitute of trees to the height of 2,000 feet, then a belt of forest to the height of 6,000 feet succeeds, from whence to the summit is bare.

In May 1877, an oceanic wave caused great damage among the islands; it appears to have occurred simultaneously all over the group, namely, at about 4.45 a.m.

The range at Hilo was estimated at 36 feet, and at Kealakekua 30 feet; while at Honolulu it was only 5 feet.

The loss of life was small, but the damage to property was estimated at $25,000.

THE NATIVES of these islands are strong, active, and well-made, and rather above the average height of Europeans, the complexion of the upper classes being comparatively fair; the men make excellent sailors and are largely employed in vessels trading in the Pacific.

SUPPLIES, both for exportation and ships' use, may be obtained in great variety; all the usual tropical fruits and vegetables are indigenous, whilst a vast number of animals and plants introduced since the days of Cook have thriven well and are now abundant. Cattle and sheep are plentiful in all the large islands, and poultry may be obtained in any quantity. Sugar, coffee, rice, tapioca, wheat, maize, beans, peas, yams, taro, potatoes, oranges, limes, grapes, pine-apples, pumpkins, bread-fruit, plantains, and many other fruits and vegetables, flourish and are in constant demand for vessels calling at the various ports.

Cotton is an article of export, and the silkworm has been introduced, with every prospect of success.

THE CLIMATE is considered healthy to Europeans and on the whole favourable to vegetation, whilst the soil, volcanic in its origin, is generally fertile.

WINDS.—The N.E. trade wind, generally blowing strong, prevails for 8 or 9 months in the year, beginning about the early part of March, and until May blowing well from the northward. From May to October it is more easterly in direction.

The trade causes a very heavy sea in the channels, and during this period, for many miles to leeward of the larger islands, frequent calms and light baffling winds impede navigation between the various ports.

During October light trades and calms occur, and sometimes a swell from W.S.W., which makes the anchorages on the lee sides of the islands disagreeable, though not unsafe.

During November and December the trade is strong, but irregular, and sometimes interrupted by light southerly winds.

In January and February, when the rainy season commences, strong southerly and south-westerly gales, called by the natives *Konas*, often occur, which last from a few hours to two or three days, followed by rain, and render all the lee anchorages unsafe. The rainy season usually ends in April or May.

On the west coast of Hawaii land and sea breezes are very regular.

CURRENTS.—The general direction of the currents in the vicinity of the Sandwich islands appears to be to the westward, with a rate of from one to 1½ knots an hour; but they are subject to much variation, both in force and direction, in different seasons, without appearing to be influenced by the winds or to follow any general law.

PILOTS are always ready at every port to board vessels on the usual signal being made. They are frequently retired English and American masters, and consequently know how to handle a ship. Most of the ports are accessible without their assistance, others are not; strangers, therefore, are recommended to employ them.

HAWAII, the south-eastern and by far the largest island of the group, is of triangular shape; the west coast runs nearly north and south for 100 miles from Upolu point to Ka Lae, from whence the south-east coast trends for 65 miles to cape Kumukahi, and the north-east coast for 80 miles from cape Kumukahi to Upolu point.

To one unacquainted with the great height of the mountains of Hawaii, this island might appear of comparatively small elevation, for its surface rises gradually from the sea, uniform and unbroken; no abrupt spurs or angular peaks are to be seen, and the whole is apparently clothed with a luxuriant vegetation.

On account of the great height of this island, the climate on the weather and lee sides is very different; for the N.E. trade, striking the high land, causes abundance of rain to fall on the eastern side, while on the western coast rain seldom falls; hence the rich hues on the eastern slopes of Hawaii, covered with verdure and vegetation, contrast strongly with the bare and arid look of the coast on the greater part of the western side.

On account of the numerous eruptions that have taken place on this island, and the consequent lava streams that have flowed in all directions from the volcanoes, a great part of the interior of the island is a barren desert, with but few inhabitants, and many of the once beautiful valleys have been converted into black-looking, desolate tracks of cinders, mud, and lava.

Local attraction.—Reports have been received from Lieutenant H. Pearson, H.M.S. *Sappho*, that in the vicinity of Hawaii the compass of that ship was effected when near the island, the needle being apparently attracted by the great volcanoes.

Such an important statement requires to be carefully verified by accurate magnetic observations, on shore as well as afloat, so as to determine at what distance from the island the attraction may be felt, and also whether the amount is appreciable in navigation.

Mauna Kea, 13,805 feet in height, is the highest point of Hawaii, and may be described as a vast mound, surrounded with nine cones, which may be considered as craters, long extinct, as no activity has been observed for a great number of years. The sides of this mountain are clothed with vegetation to within 1,000 feet of the summit; in the winter months frosts prevail, and it is capped with snow.

Mauna Loa is nearly as high as Mauna Kea, being 13,650 feet in height, but of very different formation. Its summit is an active crater, which appears as an enormous flattened dome, sloping gradually down on all sides, and presenting a perfectly smooth appearance from seaward, All vegetation ceases at about 4,000 feet from the summit, and from thence to the edge of the crater extend fields of lava.

This volcano was ascended and numerous observations made by the U.S. Exploring Expedition in 1841. The crater is a very extensive one, and is still active: terrible eruptions have taken place at intervals of a few years, the latest severe one was in April 1868, when more than one hundred people perished, and great destruction was caused, both by the streams of lava, the earthquake, and attendant sea wave.

Kilauea is an immense active volcano 4,400 feet high, lying 18 miles to the eastward, and on the slope of Mauna Loa. The crater is 3½ miles long, 2½ miles wide, and about 700 feet deep.

Hualalai is another magnificent peak 8,275 feet in height, near the west coast of the island. On the summit is a large crater, which has not been active for some time; the last great eruption from it took place about the year 1810.

This mountain rises abruptly on its western side, but viewed from seaward it presents a magnificent slope.

Ka Lae, the south point of the island, in lat. 18° 54′ N., long. 155° 42′ W., is very low, and rises with a gentle slope to the hills behind.

Kaalualu.—From Ka Lae the coast trends N.N.E. for 6 miles to Kaalualu, where there is a small bay and fair anchorage, formed by an old lava flow jutting out to the southward; the lava also runs out some distance into the bay, but the shallow water is easily discerned by its light green colour.

Good shelter may be obtained during the prevailing N.E. trade, but with southerly winds the anchorage is much exposed. In August 1882 H.M.S. *Sappho* remained at anchor here for 2½ days, in 10 fathoms, bottom white sand and lava patches, with the extreme of the point bearing E. by N. With 3 shackles of cable, there was plenty of room to swing clear of the edge of the lava flow.

In the N.E. corner of the bay, there is a good pier for landing, but a boat has to avoid several very shallow patches of lava on which there is always a heavy swell.

There are only a few huts here, and no supplies of any sort are to be obtained.

Honuapo is a village about 5 miles north of Kaalualu, where there is a large sugar mill near the beach, and a wharf. When practicable the coasting steamers call here, but the landing is very bad and often impracticable.

Punaluu is a very exposed roadstead in the Kau district, about 4 miles north of Honuapo. There are two buoys moored in 13 and 17 fathoms which the small coasting steamers make use of, and N.E. of them anchorage may be obtained in 15 fathoms, but it is not recommended unless the weather be very fine.

Two small lighthouses are placed in line with the buoys, and to the southward of them is a wharf, slightly protected by a projecting point of rock.

There is a large village inland, about 6 miles N.W. of Punaluu.

Coast.—From Punaluu the coast trends N.E. by E. for 49 miles to cape Kumukahi, the east point of the island, and in all this distance there are no bays or good anchorages, as it is exposed to the wind and swell.

Vessels beating up to windward against the trade wind, along this coast, are advised to keep close inshore, not going farther off than 20 to 25 miles, thereby avoiding a great deal of the current, which runs at times as much as 1½ knots per hour to the south-westward, outside this distance; the shifts of wind close inshore are generally favourable. Near cape Kumukahi there is an eddy current at times, enabling a vessel to round the cape with ease.

Cape Kumukahi is low and rocky, with some tree-covered hillocks a short distance to the westward.

From cape Kumukahi, the coast trends, with a slight curve to the north-west for 16 miles to Leleiwi point. This coast is precipitous, and the sea continually beats on it with violence.

There are several villages near the shore, and the land is well cultivated; sugar-cane, coffee, indigo, and arrowroot growing well.

Leleiwi point is very low and wooded, with some scattered cocoa-nut trees growing on it.

Keokea point, the eastern extremity of Hilo bay, lies 2½ miles W.N.W. of Leleiwi point.

Hilo or Byron bay, on the east side of Hawaii, is the only anchorage on this coast. It is about 7½ miles wide between Keokea point and Makahanaloa point, and 3 miles deep.*

This bay is fully exposed to the N.E. trade wind, and would afford no anchorage, were it not for the extensive shoal, called Blonde reef, which extends from the eastern part of the bay for 1½ miles in a W.N.W. direction, leaving a channel three quarters of a mile wide between its western extreme and the shore.

A barrel buoy has been placed near the western extremity of this reef, with the following bearings:—Lighthouse N.W. ¼ W.; Turret rock S.W. by W. ¾ W. This buoy is difficult to distinguish.†

There are depths of 1½ to 5 fathoms on the Blonde reef, on which the sea breaks heavily, at low water, when much swell is setting in.

The scene which the island presents as viewed from the anchorage in Hilo bay is both novel and splendid; the shores are studded with extensive groves of cocoa-nut and bread-fruit trees, interspersed with plantations of sugar-cane; through these, numerous streams are seen hurrying to the ocean; to this succeeds a belt of some miles in width, free from woods, but clothed in verdure; beyond is a wider belt of forest, whose trees, as they rise higher and higher from the sea, change their character from the vegetation of the tropics to that of polar regions; and above all tower the snow-capped summits of the mountains.

From Keokea point the coast trends with a curve, 1¾ miles W.S.W., to Cocoa-nut island, which lies off a point from which it is separated by a narrow channel only a few yards wide.

The centre of the island is in lat. 19° 43′ 51″ N., long 155° 5′ 15″ W. A ridge of rocks extend N.W. 1½ cables from the island.

A rock with 7 feet of water over it, and 5 fathoms all round, lies about a cable W. by S. ½ S. from the house on Cocoa-nut island.‡

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* *See* plan on sheet No. 1377.

† Remark book, Navigating Lieutenant T. R. H. MacFarlane, H.M.S. *Constance*, 1884.

‡ Remark book, Lieutenant H. Pearson, H.M.S. *Sappho*, 1882.

From Cocoa-nut island the coast turns sharp to the S.S.W. for 4 cables, to a creek and village called Whyeatea, where good landing may be obtained in all weathers. The water in this creek is only fit for washing purposes.

There are two piers to the northward of the entrance of the creek, alongside the northernmost of which ships drawing 15 feet of water can lie with perfect safety, there being a depth of 18 feet all along the shore at low water.

The shore then turns to the westward, along a sandy beach, for nearly a mile, to the bottom of the bay where the town of Hilo is situated.

Hilo is the principal town in Hawaii, and is next to Honolulu in importance and population. The town may be easily recognized from seaward by the tall, white, square towers of the Roman Catholic church, and the pointed white spire of the Protestant church; there are also several other large buildings, both public and private, such as the court-house, schools, governor's house, stores, &c.

There are several sugar plantations in the vicinity of Hilo, on which the town is mainly dependent for any prosperity; as, now that the whale fishery trade has fallen off, but few whalers visit the bay. Besides sugar and molasses, Hilo exports hides, tallow, goat-skins, arrow-root, rice, and a small amount of coffee.

The rain-fall here is very great, and accounts for the luxuriant verdure of the district; as much as 150 inches has been known to fall in one year.

The Hawaiian Government steamers communicate with Hilo from Honolulu once a week, and schooners run constantly between the two ports.

Supplies of nearly all descriptions can be obtained. Beef 10 cents a lb., bread about 9 cents, and vegetables at 6 cents.

A small pier has been built in front of the town, which forms a good landing place in fine weather; but with any swell on, the surf breaks some distance outside it, and then it is better to use the Waterfall or Whyeatea creeks. A *red* light is exhibited from this pier at night.

Close to the westward of the town is Waterfall creek, the mouth of the Waiaruku river, and about 2 miles from the entrance are the Rainbow waterfalls, 105 feet in height. The point on the eastern side of the entrance is called Cocoa-nut point. There is a good watering place up this creek, which is generally easy of access except when the wind is blowing hard from seaward; on such occasions the surf is high, and the rocky bar at the entrance then becomes dangerous for boats to pass. The water is excellent and abundant.

Coast.—From Cocoa-nut point the coast trends to the northward for 7½ miles, in almost a straight line to Makahanaloa point. This coast is a steep bluff, about 200 feet high, broken by deep ravines, called "gulches," in which the villages are situated; these gulches are from 800 to 1,000 feet deep, and, apparently, worn by watercourses. There is no landing for boats, as all along this coast the surf beats on the rocks with great violence.

LIGHT.—At 2 miles, N. by W. ¼ W. of Cocoa-nut point, is the lighthouse, a small white square building, 14 feet high, with a square tower above its sea face which looks like a belfry, situated near the edge of the cliff; the light exhibited is *white*, elevated 136 feet above the sea, and visible in clear weather from a distance of 10 miles.

This light has been reported, not to be depended on.*

The lighthouse is difficult to distinguish in the daytime, being an insignificant building which might easily be mistaken for a small chapel.

Anchorage.—Hilo bay is a safe anchorage, and, next to Honolulu, may be considered the best in the Sandwich islands. In 1841, during the three months of December, January, and February, when the ships of the U.S. Exploring Expedition were lying in the bay, they did not have a gale strong enough to ride to their anchors; and the residents say that the wind never reaches the force of a gale here.

With a strong trade wind there is a slight sea, unpleasant enough for boats, but not sufficient to endanger the safety of a ship. At times, however, a considerable swell sets in, which causes a ship to roll disagreeably.

The northerly wind, which is felt most, seldom blows with any strength.

A well sheltered anchorage can be picked up anywhere under the lee of Blonde reef, in from 5 to 7 fathoms, as the reef affords good protection. A vessel drawing 15 feet or less may anchor so as to be quite under the lee of Cocoa-nut island and Keokea point.

Tides.—It is high water at full and change at 1h. p.m., rise of tide about 3 feet.

Directions.—In making for the anchorage, as a general rule, it is best to close the land a little to the northward of the reef, about east of the lighthouse, and then run down along shore rather within a distance of half a mile, until Turret rock (7 cables N. by W. ¾ W. of Cocoa-nut point, and 15 feet high) bears west, when course may be altered for the anchorage under the lee of the reef.

The leading mark for clearing the west end of Blonde reef is the huts of Puneo village, on the west side of Waterfall creek, in line with the eastern side of a remarkable green hill (an extinct volcano) named Halai, bearing S.S.W. ½ W.; this is not a good mark, as the huts are difficult to distinguish at times.

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* Staff Commander T. H. Tizard, H.M.S. *Challenger*, 1875.

There is a white pyramid on Halai, the extinct volcano at the back of the town, which kept in line with the north tower of the Roman Catholic church leads over Blonde reef in 3 fathoms.

On approaching the bay from the eastward, Cocoa-nut cove, about 2 cables south of the lighthouse, is a good spot to steer for, as it leads close to the entrance of the channel. The cove appears like a dark mark in the land, and there is nothing in the vicinity which resembles it.

On putting to sea, it is advisable to beat well to windward in a north-easterly direction after clearing the reef, not attempting to weather Makahanaloa point until it can be done with certainty at a distance of 5 or 6 miles, as the trade wind may fail close in to the shore, which is very steep to, and a heavy swell and current set constantly against the precipitous cliffs.

The coast north-west of Makahanaloa point is steep and rocky, without shelter or anchorage, and innumerable cascades and streams run down the mountain sides, over the cliffs, into the sea. Here and there are a few small bays, or breaks in the cliffs, where the natives are able to land in their canoes on the sandy beaches.

From Makahanaloa point the coast trends W.N.W. for 33 miles, to a small bay about 4 miles wide, under mount Kohala, but it is too much exposed to be used as an anchorage. Two miles west of this bay, off the western extremity of some black rugged cliffs, are several rocky islets a short distance from the shore; from thence to Upolu point, a distance of 15 miles, the sea breaks heavily near the coast, and a heavy confused sea sets up, which may possibly arise from a sudden decrease in the depth, as Vancouver obtained soundings of 7 fathoms at 2 miles from the shore.

Upolu point is the northern extremity of Hawaii; the land behind is an extensive plain, in a good state of cultivation, which rises gradually to the foot of the mountains.

From Upolu point, the coast curves round quickly to the southward, and trends for 11 miles S. by E. ½ E. in almost a straight line to Kawaihae bay.

Mahukona is a small village with anchorage off it, about 6 miles south of Upolu point. The place is becoming of importance through the energy of a Mr. Wilder, who has made a most convenient landing-place, and constructed a railway, 15 miles in length, to bring the sugar from the Kohala district, round the north end of the island. The cargo boats lay alongside the pier and are laden and cleared very quickly by means of a steam "crab" which works a truck up and down the incline.

There is no water in the place. Mr. Wilder went to great expense in sinking an artesian well, without result, and in consequence all the fresh water has to be brought from Kohala by train.

There are two spar buoys moored in line, W. by S. of the landing-place, in 5 and 9 fathoms, to which the small coasting steamers make fast, head and stern, whilst loading and unloading.

Anchorage may be obtained in 10 fathoms, a little to the southward of the outer buoy; but it is not very good on account of the nature of the bottom, which is coral with sandy patches, and the strong gusts off shore, which blow continually from off the Kohala hills in the day time, but generally cease at sunset during the N.E. trade; and vessels are liable to drag off the bank, which is steep-to. This anchorage therefore is but indifferent, and, with winds to the westward of north or south, would be untenable.

Freight is disembarked and shipped at night, during the greater part of the year.

The soil along this shore is barren for 3 or 4 miles inland, owing to the want of rain. The face of the country is regular, ascending gradually from the coast to the summits of the high land.

The coast from Mahukona to Kawaihae bay appears clear of off-lying dangers, and no bottom was obtained with 20 fathoms of line, at a distance of 1½ miles from the shore.

Kawaihae bay is an extensive open bay, about 8 miles wide, and 4 miles deep, fully exposed to the westward.

Situated in a grove of cocoa-nut trees, just behind a sandy point, near the centre of the bay, is the village of Kawaihae, the sea-port of the northern districts of Hawaii. The village consists of a general store, two or three houses, and several huts along the shore. In front of the village is a pier for boats.*

So much of the soil of this district as lies along the coast, though rich, is badly watered, and 7 or 8 miles in the interior from Kawaihae bay, it becomes exceedingly rocky and barren. The high land to the eastward of Kawaihae causes almost a perpetual calm. The climate is, upon the whole, unpleasant, especially at Waimea, about 9 miles eastward of Kawaihae, in consequence of the trade wind, which is exceedingly strong, bringing with it a mist towards sunset. This wind rushes furiously down between the mountains which bound the valley of Waimea, and becomes very dangerous to shipping in the bay. It is called by the natives *mumuku*, and is foretold by them from an illuminated streak that is seen far inland which is believed to be caused by the reflection of the twilight on the mist that always accompanies the *mumuku*.

The principal exports of the district are hides, tallow, and beef.

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* *See* plan on sheet No. 1377.

On approaching the anchorage, a good land-mark is a conspicuous mound, situated a short distance south of the village, which was used formerly as a place for offering human sacrifices to the god of war. Another conspicuous mark is a white tomb, in the form of a pyramid, lying 2½ cables E. ½ S. of the lighthouse.

LIGHT.—A *fixed* white light is exhibited to serve as a guide to the anchorage, elevated 50 feet above the sea, and visible in clear weather from a distance of 10 miles. The light is placed upon a pillar, in the form of a pyramid, which is painted white.

Supplies.—Beef may be obtained here at 6 cents a lb., potatoes are abundant, and plenty of fish may be caught with the seine.

The watering place, which is in a small sandy bay, is only a pool of rain-water collected in a hole, and would require 500 feet of hose to pump it into a boat. In the summer the water becomes somewhat stagnant, and unfit for drinking purposes; in winter, more rain falls, and it then becomes a stream.

Buoy.—A red buoy, for the local mail steamer, is moored in 6½ fathoms, about 3 cables from the shore; but it is not always in position. Vessels are not supposed to anchor inside this buoy.

Reef.—Towards the bottom of the bay there is a coral reef which dries in places at low water, extending for nearly three-quarters of a mile from the shore, in front of the village. This reef is a great inconvenience to the anchorage, which at best is but an indifferent one. From the N.W. extremity of this reef the lighthouse bears N.E. by N. ½ N. There is a boat passage round the north end of the reef, close along the shore, where landing is easy.

Anchorage.—The best anchorage is in 9 or 10 fathoms, with the lighthouse in line with a flagstaff erected on a hill, some way up the slope, bearing East about 4 cables. The bottom inside this depth is very uneven, there being coral heads with only 4½ to 5 fathoms on them, and having depths of 7 to 9 fathoms between.

With strong westerly winds the anchorage would be very exposed, and most unsafe to remain at.

The sea breeze from the westward lasts all day, and the N.E. trade or land breeze, sometimes blowing strong, all night.

Caution.—It is necessary to approach this anchorage with the greatest caution, as in fine calm weather the swell seldom breaks on the reef extending from the shore off the village.

Coast.—From the bottom of Kawaihae bay the coast trends for 30 miles, S.W. by S., to Lae-o-ka 'Mano or Shark point then S. ½ W. for 10 miles to Kalaua, the western extreme of the island, where it turns to the eastward for 3 miles to Kailua. Along the whole of this coast there is no shelter, and the shore line has been much altered by the lava streams which have flowed from the crater of Mauna Loa.

Kailua bay is a small indentation in the coast, 2½ cables wide, and 2 cables deep; it is exposed to the southward and westward, but affords good anchorage at most seasons of the year.*

At the time of the visit of the U.S. Exploring Expedition in 1841, the residence of the governor of Hawaii island was established here, and great advances were being made in the civilized arts and industries. On a point on the west side of the bay is the tomb of king Kamehameha, which is in lat. 19° 37′ 20″ N., long. 156° 4′ 20″ W.

Rain seldom falls on this coast, except in showers, and a rainy day once in the year is looked upon as something remarkable. This, together with the absence of all dew, prevents the existence of much cultivation; it affords nevertheless a coarse vegetation, sufficient to pasture a few hundred goats; but a mile back from the shore, the surface is covered with herbage, which maintains cattle, &c.; and two miles in the interior there is sufficient moisture to keep up a constant verdure.

The temperature is mild and equable; during the winter the thermometer ranges from 64° to 85°, and in summer from 68° to 86°.

The prevailing winds are the land and sea breezes, which are very regular; there are also strong north winds, but the most severe gales are those from the south-west, which last from a few hours to two or three days and render the anchorage unsafe.

In approaching Kailua bay, bring the summit of Hualalai, 8275 feet, to bear N.E. by E., and steer in on that bearing; the town may be recognized by the two churches, and the cocoa-nut groves on the shore to the westward.

A small light is exhibited from a stand on the west side of the bay, when schooners or coasting steamers are expected, and is visible for about 6 miles.

There is a most convenient landing-place on a sandy beach, on the west side of the bay, formed by the jutting out of two points, between which is a small cove, protected from the surf by some rocks.

In 1876, H.M.S. *Myrmidon* anchored here in 13 fathoms, sand; with West low point N. 73° W.; largest church N. 35° E.

Coast.—From Kailua the coast trends in almost a straight line, S. by E. ½ E., 8½ miles to Kealakekua bay.

Kealakekua bay, situated on the west side of Hawaii, affords the best anchorage on that coast, and lies between Lava and Cocoa-nut points, which are 1½ miles apart, N.W., and S.E. of one another.*

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* *See* plan on sheet No. 1377.

The bay derives its name (path of the gods) from a slide in the hill, still visible, which the gods are said to have used in order to cross the bay quickly.

The climate is mild throughout the district; the thermometer ranging from 62° to 76° in winter, and from 70° to 86° in summer. Strong winds are seldom experienced; and during the day there is a cool sea-breeze which changes to the land-breeze at night.

Kona, a village a few miles inland, is considered one of the most healthy spots in the whole group, and especially beneficial to people suffering from weakness or disease of lungs or chest. Many visitors come here from California to pass the winter, and there are one or two commodious boarding houses for their accommodation.

From Lava point, the coast, which is steep-to and 15 to 20 feet high, trends in a slight curve, E. by S., for 6 cables to Cook point, which is flat and barren, and forms the southern point of Kaavoloa cove. From thence the coast turns to the northward for 2 cables to Pillar point at the head of the cove.

A small light is exhibited from Cook point, when the local mail steamer is expected.

Kealakekua bay is well known to history, as having been the scene of the death of Captain James Cook, R.N., the great navigator, who was killed here by the natives on 14th February 1779.

On the west side of Kaavoloa cove is a village of the same name, where the monument in memory of Captain Cook has been erected, but now (1879) cocoa-nut and other trees are growing up, and the monument is not readily distinguishable from seaward. It is an obelisk on a square foundation, about 26 feet high, in lat. 19° 29′ N., long. 156° 2′ 40″ W.*

From Pillar point, the coast, which is a high rocky inaccessible cliff from 400 to 600 feet in height, turns E.S.E. for 9 cables, in almost a straight line, to a sandy beach, where the village of Kealakekua is situated near a grove of high cocoa-nut trees; and then for 3 cables S.W. by S. to Peterel point, from whence it trends with a curve for 7 cables S.S.W. to Cocoa-nut point.

Cocoa-nut point, the southern extremity of the bay, is low and black, with a fringe of cocoa-nuts along the shore, inside of which, in the first rise of the land, is a very conspicuous white church.

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* Placed in position by H.M.S. *Scout*, Captain R. P. Cator, in November 1874, and bears the following inscription :—

"In memory of the great circumnavigator, Capt. J. Cook, R.N., who discovered these islands on Jan. 18, A.D. 1778, and fell near this spot on Feb. 14, A.D. 1779. This monument was erected in Nov., A.D. 1874, by some of his fellow-countrymen."

Between Kealakekua and Cocoa-nut point, the coast has a rugged appearance for about a mile inland, beyond which the country rises with a gradual ascent towards Mauna Loa, and is overspread with cultivated enclosures and groves of cocoa-nut trees where there are numerous villages.

The shore all round the bay is covered with a black rock, which makes landing very dangerous when there is any swell setting in; except at the village of Kealakekua, where there is a fine sandy beach, with a morai or burying place at one extremity and a small well of fresh water at the other.

Directions.—The summit of Mauna Loa bearing E. ¾ N. will lead to Kealakekua bay, but should the summits of the mountains be obscured, which is often the case, the church on the slope of the hill, about a quarter of a mile inside Peterel point, is a good mark.

Landing. — The best landing-place is about half a cable to the southward of Cook's monument, from whence there is a good road leading to Kona.

Supplies.—Beef, fowls, sweet potatoes, and plantains can be obtained in Kealakekua, also water at Niapupu, a village south of Kealakekua, but the tank is falling into decay, and the water is brackish in all wells in the vicinity of Kaavoloa cove.

Anchorage.—This bay is easy of access, but the anchorage is not good, owing to the great depth of water and foul state of the bottom.

Between Cook and Peterel points there are depths of 30, 25, and 10 fathoms, bottom chiefly composed of sand and shells; in the vicinity of Peterel point, however, the bottom is rocky.

Large vessels usually anchor in the middle of the bay, in 25 fathoms, sand, with Cook's monument bearing N.W., and Cocoa-nut point S. ½ E.

Kaavoloa cove, though exposed to winds from south and south-west, may be considered a safe anchorage except during the winter months, Cook point partially protecting the anchorage from the swell. In 1876, H.M.S. *Fantome* anchored in Kaavoloa cove in 30 fathoms water, abreast Cook's monument, mooring with a stern hawser to the shore; and during her stay of six weeks (in October and November) southerly winds were experienced only on two occasions, when a disagreeable swell set in although the wind was light, landing however was not interrupted.

Earthquake.—On 24th February 1877 a slight shock of earthquake was felt at Kaavoloa and steam was observed to be rising from the sea off Cocoa-nut point; on visiting the spot, it was found that lumps of porous lava, some nearly a cubic foot in size, were rising to the surface, whence, on the contained gas escaping, they sank again. This part was sounded over on 4th March, but nothing less was obtained than 23 fathoms at 400 yards from the shore, 50 and 67 fathoms and 80 fathoms a little further out. At the time of the earthquake, a crack opened in the ground from Cocoa-nut point in an E.S.E. direction, extending for more than a mile, in some places 4 inches broad and 50 feet deep.

Coast.—From Kealakekua bay the coast trends in a general direction of S. by E. for 25 miles to Kaulanamauna, and then in a curve to the E.S.E. for 20 miles to Ka Lae, the south point of the island.

Almost the whole of this coast is a line of lava. This frequently lies in large masses for miles in extent, and is in other places partially broken, exhibiting perpendicular cliffs, against which the sea dashes with fury. This formation extends half a mile into the interior, and as the distance from the sea increases, the soil becomes richer and more productive. The face of the country, even within this rocky barrier, is rough and covered with blocks and beds of lava, more or less decomposed. The land in places reaches the altitude of two thousand feet, and at a distance of two miles from the coast begins to be well covered with woods of various kinds of trees, which are rendered almost impassable by an undergrowth of vines and ferns. In some places these strips of woods descend to within a mile of the shore, having escaped destruction. These are in no case parallel to the shore, but lie always in the direction which the streams of lava would take in descending from the mountains.

ALENUIHAHA CHANNEL, which separates Hawaii from Maui and Kahulaui islands, is 24 miles across, and clear of dangers.

During the N.E. trade, the wind frequently blows through the channel with great violence, and there is also a strong current setting to the westward; vessels from any of the western ports of Hawaii are therefore recommended to keep close in under the lee of the island until reaching Upolu point, when they will be enabled to fetch across to the channel on the west side of Maui. Ships from the northward, bound to Hilo, will probably find it impossible to weather Upolu point from the west side of Maui, but on getting under the lee of Hawaii the trade wind fails until reaching the south point of the island, when they will have to beat against the wind and current along the south-east coast, as before mentioned. A steamer would find it advantageous to round Upolu point and proceed along the east coast of the island, as the trade wind fails when close in to the point and does not blow home with any force along the whole of this shore.

MAUI ISLAND, 43 miles long in a W. by N. and E. by S. direction, is divided into two oval-shaped peninsulas, connected by a low isthmus, 6 miles across, and only a few feet higher than the beach.

At a distance it appears like two distinct islands, but on nearer approach a low isthmus is seen uniting the two peninsulas. The whole island, which is entirely volcanic, was probably produced by the action of two adjacent volcanoes, which have ejected the immense masses of matter of which it is composed. The appearance of Maui resembles Tahiti more than the neighbouring island of Hawaii. The eastern peninsula, which is the larger of the two, is lofty ; but though its summits are often seen above the clouds, they are never covered with snow.

Although on a first view the peninsulas resemble each other, on closer examination they are found to be very different. East Maui is the larger of the two, and rises in one unbroken mountain 10,030 feet in height, which falls almost perpendicularly towards the sea. West Maui has many sharp peaks and ridges, which are divided by deep valleys, and which, in descending towards the sea, open out and form sloping plains of considerable extent on the north and south sides. The highest peak of West Maui, Mauna Ika, is 6,130 feet in height.

The isthmus, which is very low, consists of sand which is constantly shifting, and thrown up into *dunes*. It is too dry to be fit for cultivation, but during nine months of the year it is a fine grazing country, and feeds large herds of cattle that are mostly owned by foreigners.

East Maui, though mountainous, has most cultivated land, and the rich volcanic soil of the Kula district, on the south-west side of the island, raises abundant crops of potatoes. Wheat and other grain is also cultivated, and increasing.

The productions of Maui are the same as those of the other islands : to these may be added a few fruits, as grapes, &c.

Mauna Haleakala is somewhat like Mauna Kea in Hawaii : it is destitute of trees to the height of about 2,000 feet ; then succeeds a belt of forest, to the height of 6,500 feet, and again, the summit which is cleft by a deep gorge, is bare.

The crater of Haleakala, or house of the sun, is a deep gorge, open at the north and east, forming a kind of elbow : the bottom, as ascertained by the barometer, was 2,783 feet below the summit peak, and 2,093 feet below the wall. Although its sides are steep, yet a descent is practicable at almost any part. The inside of the crater is entirely bare of vegetation, and from the bottom arise some large hills of scoria and sand : some of the latter are of an ochre-red colour at the summit, with small craters in the centre. All have the appearance of volcanic action, but the natives have no tradition of an eruption.

Coast.—The south-west point of Maui, cape Hanamanioa, is formed by rugged, craggy rocks, and the sea breaks at a little distance to the north-westward of it. The edge of the bank is very steep-to, suddenly shoaling from no bottom at 80 fathoms to 25 fathoms, and then 10 fathoms.

From cape Hanamanioa, the south coast trends E. by N. ½ N. and N.E. for 25 miles to Alau islet. The whole of this shore is rugged and affords no anchorage or shelter. From seaward, the land appears to ascend abruptly; it is densely covered with trees and vegetation, while here and there a few habitations appear.

Alau islet, lying off the east coast of Maui, is very small, and has a reef extending about half a mile to the south-east. Other patches, with 3 to 5 fathoms water on them, lie to the south and west of the islet, distant about 2 cables.

Rock.—A sunken rock, with about 8 feet on it at low water, and 13 fathoms close around, lies about three-quarters of a mile south-east of Alau islet, with the following bearings: Kauiki head, N. 32° W.; west extreme of Alau islet, N. 62° W.*

Kauiki head, the eastern point of Maui, is an old crater which is connected by a low spit to the main land, and at a distance appears like an island.

Hana harbour is formed by the peninsula of Kauiki and the islands off it, and Nanualele point, the distance between which is only 700 yards. The anchorage is well protected from the wind and sea, and is a very convenient one.

To enter the harbour, a ship coming from the southward should keep about half a mile from Kauiki head, until the entrance bears S.W., as there are besides the Twin rocks, 14 and 20 feet high, two pin rocks, 3 feet and 5 feet above water with deep water all around, which are difficult to distinguish.

Steer for the entrance on a S.W. course, keeping close to the rocks on the port hand in entering, with a store-house down by the jetty in line with a Chinese cook-shop, a short distance above it, bearing S.W., and when the two black rocks off the inner point are in line E. by N. ¾ N., anchor in 5 fathoms, sand, stones, and mud.*

H.M.S. *Sappho* anchored with the inner black rocks in line, N. 70° E.; Nanualele point, N. 22° E., and had a clear swinging berth with 2½ shackles of cable out.

The anchorage inside the two black rocks is only one cable wide, as a spit of lava runs out in the centre of the bay, forming a middle ground with only 6 feet of water over it on which the sea generally breaks; but outside a line drawn between the inner black rocks and Nanualele point, there is anchorage right across the bay in from 4 to 9 fathoms.

From information obtained here, it would be better for ships coming from leeward ports to take the passage to the northward of Maui, thereby avoiding the very strong trade wind and current experienced in rounding the S.E. point of Maui. Many steamers have been unable to steam against it at times, and H.M.S. *Sappho*, with top-gallant masts on deck, was only able to steam about 3½ knots an hour.

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* Commander Bouverie F. Clark, H.M.S. *Sappho*, 1882.

Coast.—From Hana harbour the coast trends for 20 miles W.N.W., and then 11 miles W.S.W. to Kahului harbour. There is no shelter or anchorage in all this distance, and the coast is fully exposed to the force of the trade wind.

The north coast of East Maui is a succession of deep ravines, which gradually diminish in breadth as they ascend, and are finally lost on the flanks of the mountains. Travelling along the coast in consequence becomes almost impossible. Cascades are seen falling in these ravines, several hundred feet in height, having, however, but little volume of water.

Kahului harbour, situated between the coral reefs on the northern side of the low isthmus joining the two peninsulas, is about 3½ cables wide across the entrance, and 4 cables deep, and fully exposed to the northward.*

Kahului is an important place for exporting the produce of the northern part of Maui, and there are railways connecting it with Wailuku to the westward, and Spreckelsville and Haiku on the east. In 1881, a jetty was being built out from the shore near the custom house, which it was proposed to extend as far as the edge of the reef, but at that date it was unfinished.

Hobron's flagstaff, near the low point, north-east of the town is in lat. 20° 54′ 15″ N., long. 156° 27′ 50″ W.

A beacon has been erected on the west extreme of the reef on the eastern side of the harbour, S.S.W. ½ W., of which are two buoys at a half and one cable respectively.

Anchorage may be obtained in from 2½ to 7 fathoms, with the shore end of the unfinished jetty, bearing S.E. by E., 2¼ and 3¼ cables respectively.

Tides.—It is high water, at full and change, at 11 hrs. 40 m. Springs rise 3 to 4 feet.

Wailuku.—About two miles north-west of Kahului, is the flourishing village of this name, in which is the female seminary, which is an extensive range of coral buildings, beautifully situated on an inclined plane, with high and massive precipices behind, and considered one of the best organised establishments in the Sandwich islands.

Coast.—From Kahului, the east coast of West Maui trends N.W. ½ N., for 7½ miles to Kahakuloa point, and is an abrupt precipice several hundred feet in height.

From Kahakuloa point, the coast trends West for 7 miles, and then south for 9 miles to Lahaina.

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* *See* plan on sheet, No. 1377.

Lahaina, situated on the west side of West Maui, was at one time a flourishing place, and much frequented by whaling vessels for refitting and obtaining supplies, but of late years since the whale fishery has fallen off, Lahaina has consequently suffered, and is now only visited by vessels loading with sugar, which is grown on the estates in the vicinity. Mr. Turton, an American, owns the largest estate, which in 1877 produced 2,000 tons of sugar of very good quality.

The town of Lahaina is built along the beach for a distance of three-quarters of a mile: it is principally composed of grass-houses situated as near the beach as possible: it has one principal street, with a few others running at right angles. From seaward, the town may be recognised by some conspicuous buildings, especially the Government house, which is near the beach, and has a tall flagstaff before it.

There is an open roadstead off the town, which is completely sheltered from the trade wind by the high land of Maui; but the holding ground has been reported to be indifferent, the layer of sand being very thin with rocky ground below.

Supplies of all sorts can be obtained here; beef, vegetables, fruit, and water in abundance.

LIGHT.—A lighthouse has been erected on the beach, near Government house, from which* two *white* lights, horizontal and about 4 feet apart, are exhibited, which are visible in clear weather for a distance of about 6 miles; but they cannot be distinguished as two separate lights, until within 1½ miles of the anchorage.

Landing.—The landing place is at a small pier, extending from the lighthouse, and protected by a breakwater.

Buoy.—A buoy has been moored off the pier for the use of the local mail steamer.

Anchorage.—As the shoals on the north-west side of Maui extend a considerable distance from the shore, vessels bound for Lahaina roadstead should not approach the land to the westward of it, nearer than 3 miles, until the lighthouse bears N.E. ½ N., when a good berth will be found in 10 to 15 fathoms, sand, with the lighthouse on that bearing.

From the time of obtaining soundings, the water shoals gradually to the shore, and anchorage may be obtained in any depth; 10 fathoms for a vessel of moderate size, and 13 fathoms for a large ship is to be preferred.

The anchorage used by the pilots is in 12 fathoms, sand, with Round hill, Makena, in line with the south-west point of the roadstead.

Tides.—The tide at Lahaina is irregular, being somewhat dependant on the winds: it runs to the north-west generally sixteen hours out of the twenty-four.

Lahainaluna.—The most remarkable building to be seen as the roadstead of Lahaina is approached, is the seminary of Lahainaluna, which was established in 1831, situated on the side of the mountain that rises behind Lahaina ("luna" meaning "above").

Coast.—From Lahaina the coast trends for about 9 miles to Kamalalaea bay. The southern side of West Maui has a forbidding appearance; the shores, however, are not so steep and rocky as elsewhere, and have generally a sandy beach.

There is a roadstead here called by Vancouver, Patoa, which is represented as a good anchorage, and may be easily found by attending to the following description:—The large bay, formed by the two peninsulas and the sandy isthmus, has its western side formed by high rocky precipices, that rise perpendicularly from the sea. To the westward of these precipices the coast is chiefly composed of sandy beaches, and the mountains at some distance from the shore form two remarkable valleys, separated from each other by a high rugged mountain, seemingly detached from the rest, and approaching nearer to the beach than those to the left and right of it. The anchorage at Patoa is abreast the easternmost of these valleys, which appeared fruitful and well cultivated.

Kamalalaea bay is the large bay on the south-west side of Maui between the two peninsulas, the western side of which is formed by rocky cliffs and precipices. Nearly in the middle of the western side is a village called Mackerrey, by Vancouver, off which there is anchorage in 7 fathoms, sand and broken coral, a little more than a quarter of a mile off shore.

The soundings on the eastern side of the bay are regular, but very rocky.

Near the head of this bay, in the north-east corner, is the small village of Maalaea, where there are some houses for stowing sugar.

Supplies.—Besides sugar, there is a great quantity of wheat, maize, and potatoes grown in this district; and supplies of fresh provisions are plentifully obtained from Wailuku, which is about 6 miles distant.

Anchorage.—The anchorage off this place is not good, as the trade wind blows across the low isthmus in heavy gusts, and communication with the shore by boats is sometimes interrupted.

There is a small pier here for loading and unloading schooners, and boats can always go alongside, the channel leading to the landing place being about 20 yards wide, between two coral reefs.

A spar buoy has been moored in 6 fathoms, near the anchorage, for the use of the local mail steamer, but it is recommended not to be used, as the chain is small, and has been down a long time.

Care must be taken in entering to keep the buoy well on the starboard bow; the water shoals gradually if not too near the western shore.

A good anchorage may be picked up in 9 fathoms, sand, with the pier head, N. 19° W.; spar buoy, N. 19° E.; west point of bay, S. 58° W.

H.M.S. *Myrmidon* anchored inside the spar buoy in 6 fathoms, sand, with west point of bay S. 45° W., and a remarkable black hill on the isthmus N. 9° W.

Coast.—From Maalaea, the coast trends S. by E. in almost a straight line to Makena, near the south-west extreme of the island.

Makena or Makee's landing, is a small indentation in the west coast of East Maui, near the south-western extremity of the island, and derives the latter name, from a planter whose estate is situated on the side of Mauna Haleakala, on a plateau 2,000 feet above the sea, and about 5 miles east of the landing place.*

Makena may be recognised from seaward by Round hill (Puu Olai) 500 feet high, with a flagstaff on its summit, and situated about a mile south of the landing; on a nearer approach, the stone church and several houses near the landing place will be seen.

Off the landing place, there are two mooring buoys for the trading schooners, the inner buoy lies in 5 fathoms and the outer in 8 fathoms.

The anchorage is exposed to the heavy squalls, which occasionally blow over the low isthmus in the centre of Maui; and landing is at times impracticable for ship's boats, owing to the heavy surf. The holding ground also is not good, and vessels have sometimes dragged in the squalls.

The anchorage is in 10 to 12 fathoms, sand, about 3 cables from the landing place, with Round hill flagstaff, bearing S. ¾ W.; landing shed on beach, E. by N. ¾ N.; stone church, E. by S. ¾ S. From this position, the depths gradually decrease to 3 fathoms near the shore.

MOLOKINI is a small, barren, horse-shoe shaped island, lying W. by S. ¾ S., 2½ miles from Makena. Lying almost in the middle of the channel between East Maui and Kahulaui, it would prove a dangerous obstacle to navigation, were it not so much elevated above the sea, as to be at all times visible from vessels passing between the islands.

This island is only visited by fishermen, who dry their nets on its barren surface.

KAHULAUI, which is separated from East Maui by a channel 6 miles wide (Alalakeiki channel), is about 11 miles in length, north-east and south-west, and 7 miles wide. It is low, and almost destitute of every kind of shrub or verdure, excepting a species of coarse grass. The rocks of which it is formed are volcanic, but nothing is known of any active or extinct craters on the island; and, from its shape and appearance, it is not improbable that it once formed a part of Maui, from which it may have been detached by some violent convulsion connected with the action of the adjacent volcanoes of Maui or Hawaii.

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* *See* plan on sheet No. 1377.

At one time this island was used as a place for transporting convicts to, but is now chiefly useful as a sheep run, the soil of decomposed lava being of too poor a quality for cultivation.

Shoal.—Off the south-west extremity, Kealaikahiki point, is a shoal which was first seen by Cook on his discovery of the island. In 1841, it was examined by Wilkes, who proved it to be much nearer the land than was anticipated. This shoal lies a mile and a half from the point, and has 1¼ fathoms of water over it. Vessels may pass within two miles of the point with safety; but as it is difficult to estimate the distance, it will be better to give the point a berth of three miles, as nothing will be lost by so doing.

LANAI, lying 16 miles north-west of Kahulaui, and separated from West Maui by a channel 7½ miles wide (Auau channel) is a dome-shaped island, 15 miles long, in a north-west and south-east direction, and 10 miles broad. It appears to have been frequently rent, large fissures being apparent in its sides.

The centre of this island is much more elevated than Kahulaui, but is neither so high nor broken as any of the other islands. Great part of it is barren, and the island in general suffers much from the long droughts which frequently prevail; the ravines and glens, notwithstanding, are filled with thickets of small trees. The island is volcanic, the soil shallow, and by no means fertile; the shores abound with shell-fish.

Near the shore, on the west side, are some rocks called the Five Needles, which are about 120 feet in height.

The southern shore of Lanai is usually avoided by masters of vessels acquainted with the navigation among these islands, on account of the light and variable winds or calms generally experienced there; the trade wind being interrupted by the high land of Maui and Lanai.

It is not unusual for vessels to be becalmed here for six, eight, or even ten days. The natives, in the small craft belonging to the islands, usually keep close inshore, avail themselves of the gentle land breeze to pass the point in the evening, and run into Lahaina with the sea breeze in the morning; but this is attended with danger, as there is usually a heavy swell rolling in towards the land.

MOLOKAI is a long island, situated north of Lanai, from which it is separated by a channel 6½ miles wide; and north-west of West Maui 7½ miles.

It is a long, irregular island, apparently formed by a chain of volcanic mountains, about 35 miles long, east and west, and 8 miles broad. The mountains are high, and broken by deep ravines and watercourses, the sides of which are frequently clothed with verdure, and ornamented with shrubs and trees. One-third of the island, towards the west end, is a barren waste, not susceptible of cultivation, except in the rainy season; it has in consequence but few inhabitants, who are engaged mostly in fishing. The eastern two-thirds are almost one entire mountain, rising gradually from the south, until it attains an elevation of 2,500 feet; while on the north it is almost perpendicular.

On the south side, there is a narrow strip of land, not exceeding one-fourth of a mile in width, the soil of which is very rich, and which contains the greater part of the population. Owing to the want of moisture, however, few plants will thrive even here; resort is therefore had to the uplands, which are found to be susceptible of the highest degree of cultivation.

Lae o ka Laau, the south-west extremity of Molokai is a low black point, in lat. 21° 6′ N., long. 157° 19′ W.

LIGHT.—A lighthouse has been erected on Lae o ka Laau from which a *fixed* white light is exhibited, elevated 50 feet above the sea, and visible in clear weather from a distance of 11 miles.

The lighthouse is painted white, the lantern red.

Coast.—On the south side of the island, there are several small harbours within the reef, the best of which is Kaunakakai, situated 15 miles E. ½ N. of Lae o ka Laau.

Caution.—The south coast of Molokai should not be approached at night without local knowledge, as the reef which fringes the shore is steep-to, and extends seaward in some places to a distance of 3 miles.

Kaunakakai is situated on the south side, and midway between the two extremes of Molokai, and from it the west extreme of Lanai island bears south.

From Lahaina, Molokai has the appearance of being two islands, the lowest land not being visible; a course steered for this apparent channel will lead direct to the town of Kaunakakai.

There is an outer and inner anchorage at Kaunakakai; the former is not good, owing to the uneven nature of the bottom, and the latter affords but a limited space; there is said to be not less than 4 fathoms over the bar leading to the inner anchorage, and 5 to 7 fathoms inside.

Two posts are erected on the shore for a leading mark, and a red buoy is moored in 5 fathoms, within the bar, for the local mail steamer. Vessels approaching the outer anchorage should bring the posts in line, and anchor in 10 to 13 fathoms, rock and sand; this mark also leads in mid-channel to the inner anchorage; these posts may be easily identified by having a lantern on each, from which lights are exhibited when the mail steamer is expected.

Quail and pheasants may be shot (with permission from the Government at Honolulu), but no other supplies are to be obtained at Kaunakakai.*

Coast.—From Kaunakakai the coast trends E. by S. ½ S. 5 miles, and then N.E. by E., 16 miles to the south-east extremity of the island. About 1½ miles south of this point, is a small, barren, rocky islet, called Mokuo Niki.

From the south-east point, the coast turns to the northward for about 2 miles to Kalaua, the north-east extreme, and is fronted by a reef extending about a mile from the shore.

From Kalaua, the north shore trends for 16 miles W. ½ S., to a peninsula which projects about 2 miles from the coast, on which is the leper reservation for the Sandwich islands.

Kalanao is situated near the centre of the north coast of Molokai, at the base of very precipitous mountains. The leper establishment was erected here about 1865, and since its erection, and the consequent separation of the victims of this terrible disease from the healthy inhabitants of the islands, the spread of the malignant malady has been arrested, and is now much on the decrease.

The anchorage is to the southward of a long, low point, extending from the foot of two steep remarkable mountains; it cannot, however, be considered safe, being exposed to the prevailing trade wind, and the heavy swell that occasionally sets in.

A red buoy has been moored here in 13 fathoms for the local mail steamers, which, if brought in line with the church on an east bearing, will lead to the best anchorage, in 13 to 16 fathoms, dark sand.

H.M.S. *Peterel* anchored here in 13½ fathoms, with church, E. ½ N.; North point N. ¾ E., about half a cable west of the buoy.

Landing at Kalanao, always difficult, is at times dangerous, and no supplies can be obtained.*

Coast.—From Kalanao, the coast trends for 12 miles W. by N. to Lae o ka Ilio, the north-west extremity of the island, and then turns to the southward for 9 miles to Lae o ka Laau; between these two points a commodious bay had been stated to exist, but the whole intermediate space is nearly a straight shore, composed alternately of rugged rocks and sandy beaches. In 1793, Vancouver anchored for the night in 19 fathoms water, sandy and bad holding ground; in working up, the soundings were pretty regular from 17 to 60 fathoms, fine sandy bottom; the anchorage was within a mile of the breakers, Lae o ka Laau bearing South, distant 4 miles; and Lae o ka Ilio N. 26° E., about the same distance. This position is as close as vessels can lie with safety, as this side of the island is exposed to

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* Navigating Lieutenant N. Child, H.M.S. *Peterel*, 1875.

North and N.W. winds, and to a heavy sea that is almost constantly rolling from that quarter on the shore, which makes landing almost impracticable.

OAHU, lying to the west-north-west of Molokai and separated from it by the Kaiwi channel, 22 miles in breadth, may be considered the principal island of the group, as it contains the port chiefly frequented by the shipping of the North Pacific, and is also the seat of Government.

This, the most fertile of the Sandwich islands, is about 40 miles long, N.W. and S.E., and 20 miles broad, resembling in the varied features of its natural scenery, several of the Society islands. Its appearance from the anchorage off Honolulu is remarkably picturesque: a chain of lofty mountains rises near the centre of the eastern part to a height of 3,175 feet, and descends near the middle of the island into the plain of Ewa, which divides it from the distant and elevated mountains that rise in a line parallel with the north-west shore. The plain of Ewa is nearly 20 miles in length, from the Pearl river to Waialua, and in some parts nine or ten miles across: the soil is fertile, and watered by a number of rivulets, which wind their way along the deep watercourses that intersect its surface, and empty themselves into the sea.

The whole island is volcanic, and in many parts, extinct craters of large dimensions may be seen, the best known of which are Diamond and Punch Bowl hills near Honolulu; but, from the depth of mould with which they are covered, and the trees and shrubs with which they are clothed, it may be presumed that many ages have elapsed since any eruption took place. The plain of Honolulu exhibits in a singular manner the extent and effects of volcanic agency; it is not less than nine or ten miles in length, and, in some parts, two miles from the sea to the foot of the mountains: the whole plain is covered with a rich alluvial soil, frequently two or three feet deep; beneath this, a layer of fine volcanic ashes and cinders extends to the depth of fourteen or sixteen feet; these also lie upon a stratum of solid rock, by no means volcanic, but evidently calcareous, and apparently a kind of sediment deposited by the sea, in which branches of white coral, bones of fish and animals, and several varieties of marine shells have been found. A number of wells have been dug in different parts of the plain, in which after penetrating through the calcareous rock, sometimes twelve or thirteen feet, good clear water has been always found; the water in all these wells is perfectly free from any salt or brackish taste, though it invariably rises and falls with the tide, which would lead to the supposition that it is connected with the waters of the adjacent ocean, from which the wells are from 100 yards to three-quarters of a mile distant.

Makapuu point, the eastern extremity of Oahu, is a rocky bluff about 300 feet high, in which are numerous caves, the mouths of which are at two-thirds the height, and are accessible by ascending along the side of the bluff obliquely. These caves were formerly used by the natives as burial places: they are the effect of volcanic action, and called Kaualahu by the inhabitants.

Coast.—The north-east side of the island when viewed from seaward, appears to be formed of detached hills rising perpendicularly from the sea, with rugged and broken summits; the hills are covered with wood, and the valleys between them are fertile and well-cultivated.

The coast from Makapuu point to the Mokapu peninsula trends north-west for 10 miles, and off it are some scattered islets and rocks, some of which are as much as a mile from the shore.

Lying about a mile north of the eastern extreme of Mokapu peninsula, are some rocks called Moku Manu.

Between Mokapu peninsula and Kaoio point, 6 miles to the north-west, is a deep indentation or bay which is almost completely blocked by reefs and shoals, except under the lee of the peninsula, where is the harbour of Waialai; but the passage in through the reefs has only a depth of 9 feet, which is too little to be of use, except for the smaller coasting vessels.

Kaneohe, in the district of Kulau, is the principal place on this side of the island, and is situated near Waialai harbour, just beneath the Pali of Nuuanu, at the back of Honolulu.

The climate is cooler here by a few degrees than that of the opposite or leeward side of the island, and frequent showers keep up a constant verdure.

From Kaoio point, the trend of the coast is north-west for 14 miles to Kahuku point, the northern extreme of the island, which is low and flat, and has a reef extending off it to a distance of 1½ miles or more.

Along this coast there is a narrow strip of land, varying from a half to two miles in breadth, which is only a few feet above the level of the sea, and very fertile, and has a gradual ascent to the foot of the precipices.

The scenery of this district is hardly to be surpassed in beauty, boldness, and variety; stupendous precipices rising some two thousand feet and more, with small streams rushing over and down their sides.

From Kahuku point, the coast turns to the S.W. by S. for 11 miles to Waialua, where there is a large village, and at about a mile from the shore there are regular soundings of from 13 to 20 fathoms.

This coast, from Kahuku point to Waimea, is a level plain about 6 miles by 2, but slightly elevated above the sea, and merely a good pasture. At many of the frequent holes and crevices in it, may be seen streams of fine clear and cool fresh water, making their subterranean way three or four feet below the surface from the mountains to the outlets in the sea below low water mark.

Waimea bay is a slight indentation in the coast about 4 miles north-east of Waialua, and was visited by the *Resolution* and *Discovery* in 1779, shortly after the death of Captain Cook; they anchored in 13 fathoms, sand, with the extreme points of the bay bearing S.W. by W. ½ W. and N.E. by E. ¾ E., and the mouth of a river S.E. ½ E., distant one mile.

In the bight of the bay, to the south of the anchorage, there is rocky foul ground two miles from the shore; and there is no landing on the coast to leeward, on account of a coral reef which stretches along the shore to a distance of half a mile.

Waialua lies at the northern end of the plain which separates the two ranges of mountains, at the foot of the Konahaunui or eastern range of mountains, while the northern slope of Kaala, the western range, nearly reaches it.

The coast here forms a small bay, and has a dreary aspect on first landing. The soil is sandy and poor, the huts are in ruins, and the inhabitants present a miserable, squalid appearance; but a short distance inshore an agreeable change takes place, both in the cultivation and the natives.

It was near this place that Mr. Gooch, the astronomer to Vancouver's expedition, and Lieutenant Hergest were killed by the natives in 1792.

Coast.—From Waialua, the coast trends W. by S. for 9 miles to Kaena point, the western extreme of the island, which stretches out in a long narrow point, the extremity of which is in lat. 21° 34′ N., long. 158° 17′ W.

From Kaena point, the general trend of the land is S.E. ½ S. for 20 miles to Laeloa or Barber point, the south-west extreme of the island. This side is principally composed of steep craggy mountains, some descending abruptly to the sea, others terminating at a small distance from it, whence a low border of land extends to the shore, which is formed by sandy beaches, bounded by rocks on which the surf breaks heavily.

Mauna Kaala, 1,030 feet high, which overlooks this coast, has the appearance of being a flat-topped mountain; but such is not the case, the evenness of the ridge alone giving it that appearance.

Nearly in the middle of this side of the island, is a village, in the neighbourhood of which the bases of the mountains are farther from the shore, and a narrow valley presenting a fertile and cultivated aspect seems to separate and wind some distance through the hills. The shore here forms a small sandy bay, and on the southern side between two high rocky precipices, in a grove of cocoa-nut trees, is situated the village. In the centre of the bay, about a mile north of the village, is a high rock, remarkable for its projecting from a sandy beach; at a distance, it appears to be detached to the land. Between this and the high rocky point to the southward of the village, is a bank of soundings, that extends some distance to seaward. On the south side of this bank, the soundings are irregular, from 8 to 25 fathoms, rocky bottom; but to the north of it, near the rock, no bottom was obtained with 100 fathoms of line, though not more than a quarter of a mile from shore; this was found to be the case also a little to the southward of the bank.

A short distance north-west of Laeloa point, is a small grove of cocoa-nut trees, and along the shore are a few straggling huts.

Laeloa or Barber point, the south-west extremity of Oahu, runs off in a long narrow spit, and has a dangerous reef extending from it to the southward. H.M.S. *Myrmidon*, in 1876, obtained soundings in 6 fathoms, a mile from the shore, and found the water gradually deepened as she increased her distance from the land.

Coast.—From Laeloa point, the coast trends for 7½ miles E.N.E. to the entrance of the Pearl river. The shore is low and flat, covered with bushes and scattered tufts of grass, and fronted by a coral reef from which the soundings gradually deepen to seaward.

Pearl river or Pearl lochs, situated on the south side of the island, is a large irregular shaped lagoon or inlet, greatly cut up by projecting points and islands, and the water of which is somewhat freshened at its inland extremities by the streams that run into it.*

Its name is derived from the circumstance that the pearl oyster is found here, and is the only place in these islands where it occurs.

This inlet has somewhat the appearance of a lagoon that has been partially filled up by alluvial deposits, and is connected to the sea by a narrow channel two miles in length, the entrance to which is through a break in the coral reef, 5 miles to the westward of Honolulu.

There is a bar at the entrance of this channel, on which the depth was 12 feet in 1882, and would thus appear to be slowly silting up, as in 1841, when it was surveyed by the U.S. Exploring Expedition, the least water obtained was 15 feet.

A leading mark for crossing this bar, is Montgomery's flagstaff on the Puuloa salt works, on the west side of the channel, in line with the meeting of the high land near Waimea, and the neck below it. The channel across the bar is not difficult to distinguish, on account of the discoloured water on either side.

After passing the bar, which is 400 feet wide, the depth of water becomes ample for large ships, and the basin is sufficiently extensive to accommodate any number of vessels. If the water upon the bar should be deepened, it would afford the best and most capacious harbour in the Pacific. As yet, there is no necessity for this, as the port of Honolulu is sufficient for all the present requirements.

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* *See* plan on sheet, No. 1510.

On the west side of the channel is the village of Puuloa, in the neighbourhood of which are large salt works; and near the entrance, on the eastern side, is a large yellow building, called Queen Emma's house, but which is not easy to recognise.

The extensive flats between the Pearl lochs and the sea are generally dry and barren, being great stretches of clinkers, with here and there a deep pit or crevice; scattered bushes and a small amount of grass afford pasture for a few cattle that are kept there.

Along the inshore side of the Pearl lochs is a strip of very fertile land of variable breadth, part of which is under cultivation; behind this, the land rises gradually to the plain of Ewa.

Anchorage may be obtained off the entrance to the Pearl river in 6 or 7 fathoms, which appears to be perfectly safe in ordinary weather; with a strong trade blowing there in some swell, which causes a vessel to roll considerably.

About two miles to the eastward of the Pearl lochs, and three miles north-west of Honolulu, is a remarkable circular salt-water lake, about half a mile in diameter, so impregnated with salt, that twice every year the natives take out large quantities of fine, hard, clear crystalised salt, which furnishes a very valuable article of commerce. At the time of the visit of the U.S. Exploring Expedition, it was believed by the natives to be fathomless, but on examination by Commodore Wilkes, it proved to be only eighteen inches in depth.

Between the Pearl river and Honolulu harbour, at about a mile westward of the latter, is a gap in the coral reef called the Kalihi entrance; but it only leads on to the coral flat which is very extensive hereabouts, and is only fit for canoes to navigate.

HONOLULU, the capital and principal port of the Sandwich islands, is situated on the south side of Oahu, on a narrow plain at the foot of the eastern range of mountains. Its situation was unknown to Cook and the early navigators, and even when visited by Captain Beechey, in 1827, it was an inconsiderable town of grass huts. However, the visits of the vessels belonging to the large whaling fleet to re-fit, brought much wealth, and on changing the seat of Government from Hawaii to Honolulu, the town rapidly grew in importance and appearance; and being in the track of vessels between America, and China and Australia, affords a convenient stoppage place.*

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* *See* plan of Honolulu harbour No. 1378.

The aspect of the country around Honolulu, as seen from the roads, is barren; and the plain on which the town stands is destitute of verdure. This plain extends both east and west from the town, while behind it the land rises gradually towards the Nuuanu valley. Several crater-shaped hills are in sight, one of which called the Punch Bowl hill or Puowina, 498 feet in height, lies close to the north-east side of the town.

The central part of the town consists of regularly laid-out streets, on either side of which stand houses and warehouses constructed after the European style, generally painted, and frequently placed within spacious enclosures with gardens; while the outer portions or suburbs are still chiefly composed of grass huts inhabited by the natives. Amongst the principal buildings, are the fine and spacious Government houses in which all the public offices are enclosed, the king's palace, a fort, two hospitals, several churches and chapels belonging to the different religious denominations, a custom house, sailors' home, and several schools, some of which for the natives are with compulsory education, which system has had the most satisfactory results, as the increased knowledge of the inhabitants testifies.

The place of observation of the Transit of Venus in December 1874, (situated 2·7 cables S.E. by E. ¾ E. of the Custom-house lighthouse), is in lat. 21° 17′ 56″ N., long. 157° 51′ 50″ W.

A quarantine hospital has been built on the west side of Honolulu harbour, on ground reclaimed on the coral reef.

There are also ample wharves, foundries, workshops, and ship-yards, which are capable of performing considerable repairs, should the occasion arise.

The population, which at one time was decreasing, is now slowly on the increase, and in 1875 numbered about 15,000.

Being the residence of the King, and the seat of Government, a commissioner and consul-general for England, commissioner and consul for France, minister resident for the United States, and consuls for most of the naval powers reside here.

The principal articles of export comprise sugar, coffee (a small quantity), hides, wool, oil and whalebone. Imports are wines, spirits, and machinery for sugar mills from the United States, and Manchester goods from England. Between 1865 and 1873, the total value of the exports fluctuated between 1,660,000 and 2,360,000 dollars.

The Royal mail line of steamers running between San Francisco and Australia, call here once a month each way, remaining in harbour for six daylight hours; the line consists of two English and two American steamers. There is also a monthly steamer from San Francisco, which arrives on the intermediate fortnight, and waits at Honolulu for a week, so that the return steamers both leave within a few days of each other.

Communication between the islands is kept up by two or three small, but effective steamers.

The climate of Honolulu is generally very pleasant and healthy, especially when the N.E. trade wind prevails, but the southerly and south-westerly winds are called by the natives the " sick-winds," because they are followed by small ailments, gastric maladies, and intermittent fevers, as is the case with the sirocco in Europe.

The following meteorological observations were taken in 1876:—

Month.	Mean Bar.	Mean Ther.		Rain Days.	Prevailing Winds.
		Noon.	Mid.		
January -	30·23	73	70	16	N.E. force 8 maximum.
February -	30·24	78	69	10	N.E. „ 3 average.
March -	30·19	75	72	15	S. „ 3, calm at night.
April -	30·28	77	71	15	N.E. „ 4, light at night.
May -	30·28	79	72	11	N.E. „ 4.
June -	30 25	80	73	5	N.E. „ 3.
July -	30·22	80	75	13	N.E., calm at night,
August -	30·15	81½	75	15	N.E.
September	30·11	81	75	5	N.E. 21 days, S.E. 9 days.

The barometer generally falls below 30·00 during southerly winds.

Supplies of all kinds are plentiful; beef, mutton, fowls, eggs, vegetables, and fruit can be obtained at moderate prices. Water can be procured from the shore in a tank; it is good, but very expensive even in the inner anchorage, 2½ dollars a ton, and the additional charge for taking it outside the reef is excessive.

Coal of good quality can be obtained from the European firms in Honolulu, Welsh at 17 dollars a ton, and Australian 13 dollars a ton (1878).

Implements and building materials, with the exception of timber, which is good and moderate in price, should not be procured in Honolulu, as the price of them is excessive. The demand for, and sale of articles required for the equipment of ships has so diminished of late through the falling off in the whale fishery, that the traders can only exist by charging much higher prices.

Patent slip.—A patent slip has been constructed by the Government on the point of land on the east side of the harbour opposite the outer lighthouse, as it has hitherto been found necessary to send all vessels requiring repair to San Francisco, the port of Honolulu being unsuitable for operations of that kind. This patent slip will answer the purpose of a dry dock, and may be described as a sort of cradle or cage in which the ship is enclosed, the keel and sides being supported from stem to stern. The cradle is so constructed that the weight of the vessel is equally distributed, and that the pressure on the ground is not heavier than that of an ordinary locomotive.

The vessel being thus encased, is lifted out of the water by an engine on to an inclined plane, upon which a line of rails has been laid down, and the engine is strong enough to raise to the required height a vessel of 1,700 tons in ballast. Vessels of greater tonnage can be raised high enough to admit of their screws being removed, and their hulls cleaned.

The charges (as in San Francisco) are 50 cents per ton for the first 24 hours, and 20 cents per ton for lay days. The repairs may be executed either by time or by contract, as may be previously agreed.

Outer Anchorage.—Outside the reef and a short distance to the eastward of the entrance to the harbour, anchorage may be obtained in from 15 to 20 fathoms, but the holding ground is not good, as the bottom is hard sand and coral and very uneven. Although this anchorage is safe during the summer, when the trade wind is steady, it is not advisable to use it during the winter, when the winds are variable, and squalls from the southward with a heavy sea are not uncommon.

Honolulu harbour is formed by an opening in the coral reef, about 150 yards wide at the entrance, and 300 yards wide off the town, and rather more than a mile in length in a north and south direction; but though small it is capable of accommodating a good many vessels by mooring them head and stern, the smooth water inside enabling them to secure close to one another.

The bar at the entrance of the harbour has a depth of 21 feet over it at low water springs; but inside, the depth varies from 4 to 6 fathoms. Vessels drawing more than 20 feet are not recommended to attempt the passage, and with any swell on no vessel drawing more than 18 or 19 feet should enter.

During the visit of H.M.S. *Challenger*, in 1875, the harbour was said to be silting up slightly; dredging operations had been carried out, and it was proposed to dredge to the original depth.

In 1884, dredging was still being carried on alongside the wharves, the mud being utilised to reclaim some waste ground inside a line between the patent slip and jetties.

Tides.—It is high water, full and change, at Honolulu at 4h. 25m.; springs rise 2½ to 3 feet. The tidal streams are regular, running 6 hours each way, the flood to the westward.

LIGHTS.—Near the edge of the western reef of the channel leading into Honolulu harbour, at a distance of 6 cables from the entrance, a wooden lighthouse, painted white, has been erected on piles, from which, at an elevation of 26 feet, a *fixed* white light is exhibited, visible in clear weather from a distance of 9 miles, between the bearings of East, through north, and N.W. by W.

Near the custom house, on the east side of the harbour, a *green* light is exhibited from a box painted brown, on a white skeleton platform, at an elevation of 43 feet above high water, and should be visible in clear weather from a distance of 2 or 3 miles.

These two lights are 2½ cables apart, and when in line bearing N. by E. ½ E., lead over the bar in 21 feet water, at low water spring tides.

Buoys and beacons.—A buoy marking the outer anchorage off Honolulu, painted black and red, with staff and cage, is moored in 15 fathoms, a quarter of a mile from the shore reef, with the outer lighthouse bearing N. by W., and Diamond head, E.S.E.

The channel into the harbour is marked on the eastern side by a spar buoy, painted black, at the entrance, and five red can buoys, lying rather more than a cable apart, close to the edge of the reef. The western side is marked by a black barrel buoy moored near the entrance, in 21 feet water, opposite the spar buoy, and should be passed on its eastern side, and by piles erected on the edge of the reef, the outer pile being abreast the third red buoy from the entrance; the inner pile has a white disc. These piles are not to be depended on, as they are sometimes knocked down. The outer edge of the reef in front of the lighthouse has been marked by a small spar buoy, westward of which vessels should not attempt to pass.

When the mail steamer is expected the buoys in the channel are lighted with lanterns.

Pilots usually board vessels between Diamond head and the outer buoy, and it is desirable to accept their services, as, under orders from the harbour master they moor vessels, and it is not always open to pick your own berth.

Directions. — In approaching Honolulu from the eastward, the truncated conical crater of Diamond hill comes prominently into view, and is an excellent landmark. Shape a course to pass at least one mile to the southward of it, and when it is abeam, steer N.W. by W., when the outer buoy will soon appear directly ahead. If intending to anchor outside the reef, the best place is in the vicinity of the fairway buoy.

Vessels approaching Honolulu at night, intending to anchor outside, should use the leading lights in line bearing N. by E. ½ E., and be most attentive to the soundings, obtaining bottom under 40 fathoms, and not coming into less than 12 fathoms before anchoring.

To enter the harbour, keep the lighthouses in line, which will lead across the bar in 21 feet at low water springs, until the vessel is at a distance of 3 to 2 cables from the reef lighthouse; then alter course about a point to the eastward, so as to clear the end of the reef on which the lighthouse is built; thence to the anchorage off the town.

Vessels in Honolulu harbour not lashed alongside the wharves have to moor head and stern, for which purpose anchors are placed at convenient distances on the reef, on the west side of the harbour. It is advisable to moor with the vessel's head about N.E., as the heavy squalls blow over the land from that direction. During the winter months it is often necessary to drop an anchor under foot, as the wind frequently shifts to the south-west and blows strong, but with sufficient warning to prepare for it; during this season it is advisable, if possible, to select a berth near the lighthouse, where there will be room to swing, if it becomes necessary to slip the stern chain.

In 1880, vessels drawing 22 feet could secure alongside the wharf.*

Vessels leaving Honolulu under sail, either for the northward or eastward, are recommended to shape course about S.W. for 30 miles or more, before hauling up to the northward, so as to keep in a belt of wind which blows through the *pali* over Honolulu, and leads into the true trade wind. By keeping close inshore, vessels will probably be becalmed for some time; merchant vessels trading between Honolulu and San Francisco generally leave with yards squared, until they pick up the trade clear of the influence of the island.

Coast.—From the entrance of Honolulu harbour, the coast trends in a curve for 4 miles S.E. by E., to Leahi or Diamond head, and is fronted by a coral reef, which extends in some places half a mile from the shore.

Diamond hill or Leahi is an extinct crater with rugged edges, 761 feet high, and about half a mile in diameter at its summit, lying 3½ miles S.E. by E. of Honolulu. It is highest towards the water, then slants down and back, and drops suddenly into a low plain that extends back to the mountains.

Signal station.—A signal station is situated on a knoll called Telegraph hill, 292 feet in height, about three-quarters of a mile north of Diamond hill, and from it all vessels are signalled to the town as soon as sighted.

Waikiki is a village lying about a mile north-west of Diamond hill; there is anchorage in front of it, which is occasionally used, but not recommended, as sailing vessels who are sometimes compelled to bring up there, almost always lose their anchors.

Between Honolulu and Waikiki there is a vast collection of salt-ponds, which at one time produced large quantities of salt, but are not worked now, and are being filled in.

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* Lieutenant E. Fleet, H.M.S. *Gannet*, 1880.

Coast.—From Diamond head the land trends away E.N.E. for about 7 miles, and then turns to the southward to Kawaihoa point, which lies E. ¾. N. 6 miles from Diamond head, and is formed of barren rocky cliffs, rising so suddenly from the sea, that to all appearance a vessel might pass close to them. The bay between these points is apparently shoal and rocky, and the surf breaks violently on the beach, behind which is a lagoon.

Koko head, 1½ miles N.E. of Kawaihoa point, is rather low towards the water, then slopes up and back, depresses, then rises and runs back into the mountains.

From Koko head the coast trends for 3 miles N.E. by N. to Makapuu point, the eastern extreme of the island.

KAUAI, the next island of the group, lies 64 miles W. by N. of Oahu, and is separated from it by the Kaieie Waho channel. This island is of volcanic formation, somewhat circular in shape, 28 miles long, east and west, and 23 miles wide, and rises in the centre to a peak about 5,000 feet in height.

Kauai was the first island of the group that was visited by Cook, in January, 1778, and he was much struck by the care with which the natives managed their plantations. From seaward, the N.E. and N.W. sides appear broken and rugged, but to the south the land is more even, the hills rise with a gentle slope from the shore, and at some distance back are covered with wood. The highest point of the island is called Waialeale, and it is said that there is a crater on the summit, which the natives ascend in clear weather to gain a view of Oahu.

This island is considered one of the most pleasant of the group, and the difference of latitude between Kauai and the southern part of Hawaii is enough to make a perceptible difference in climate. Portions of Kauai appear better adapted to agriculture than the other islands, and the coffee and sugar plantations on the weather side, which is well watered with streams and frequent rains, are very productive, but the lee side is dry and adapted to cultivation only in the valleys.

Makanuena, the southern point of the island, is a bold, bluff, barren, high, rocky headland, falling perpendicularly into the sea, with a remarkable dome-shaped mountain a short distance to the north-westward of it.

From here, the coast trends to the N.E. for 7 miles to Kawai point, the southern point of Nawiliwili bay. This part of the island is well watered, and a heavy sea rolls in on the coast.

Nawiliwili harbour is a small cove or indentation on the south-east side of the island, at the head of Nawiliwili bay, situated between Carter and Ninini points, which lie N.E. ½ E. and S.W. ½ W. of one another, 8 cables apart, and affords anchorage in from 6 to 8 fathoms, with tolerable protection from the trade wind. The harbour is about 7 cables deep in an east and west direction, but the greater part of it is blocked by shoals and reefs.*

There is a large village at Nawiliwili, and the soil in the vicinity is rich, producing sugar-cane, taro, beans, sweet potatoes, &c.

A spit, with from one to 3 fathoms over it, on which the sea always breaks, projects from the south shore near Carter point, in a northerly direction for 4 cables, leaving a channel rather more than a cable broad, and having a depth of 4 fathoms, called Middle channel, between its extremity and Kuku point on the north shore. This channel leads to the southward between the spit and the shore reefs, to an inner harbour in the south-west corner of the bay, where there is from 2 to 4 fathoms water.

A small pier has been built in the north-west corner of the harbour, where landing may be easily effected; but it should be approached with caution, as a reef extends from the shore to the southward of it for 2 cables in an easterly direction.

A red buoy for the local mail steamer is moored in 4 fathoms off Kuku point.

Ninini point, on the north side of Nawiliwili bay, is low, level, grassy land, sprinkled with volcanic boulders, which extends from a range of low hills that stretch along the coast at a short distance from the beach.

Wailua.—From Ninini point, the coast trends for 5½ miles N. by W. to Wailua, which is situated on a small river of the same name, in a barren, sandy spot, though the surrounding district is extremely fertile, and was formerly a place of some importance.

The river, in common with all those along this coast, is closed at the mouth with sand-bars, but inside it is deep and navigable for several miles by canoes.

In 1880, a small steamer was observed secured to a buoy off Wailua, apparently inside a reef, as breakers were observed all around to seaward.†

Coast.—From Wailua the coast turns outwards again for 6 miles N. by E. to Kanala point. It appears to be free of outlying dangers, and at a distance of a mile from the shore, no soundings could be obtained with the hand lead. Sugar cane appears to be cultivated along this coast in large quantities, especially in the vicinity of Wailua and Kanala point, where there are several sugar factories.

Kanala point, the north-east extreme of the island, is a low rounded point projecting into the sea from a very remarkable forked hill, which is nearly detached from the rest of the connected mountains of the island.

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[*] *See* plan on sheet, No. 1377.

[†] Navigating Lieutenant W. W. Turner, H.M.S. *Pelican*, 1880.

From Kanala point, the coast trends round in a curve, to north and west for 14 miles to Hanalei bay, and has several small villages scattered along it, near the mouths of mountain streams which are closed by sand-bars. The land near the sea is flat and very fertile, but soon rises to the mountains behind. The rivers as well as the sea abound in fish, which afford a plentiful harvest to the fishermen.

Hanalei bay, situated on the north side of Kauai, is semi-circular in shape, and lies between two conspicuous bluff heads which cannot be mistaken, and is about a mile wide at the entrance by nearly a mile in depth; but the whole of this area is not anchorage ground, the shores being fringed with a reef which, on the east side (opposite the mouth of the river, and the bluff northward of it) sends out a spit, over which there is about 9 feet of water, with detached heads, to the distance of 3 cables from the beach.*

The bay is easily entered, and tolerably spacious; but completely exposed to all winds from north-westward, gales from which quarter must send in a very heavy sea; though some vessels have ridden out the season in spite of everything.

The village or town of Hanalei, is situated near the bottom of the bay, and the scene from the anchorage is very picturesque; the mountains rise to a height of from three to four thousand feet, and are clothed with verdure from base to summit, with numerous rills coursing down their precipitous sides. In front of the town is a good beach where great quantities of fish may be caught with the seine.

The district derives its name (land of rainbows) from the numerous rainbows formed by passing showers, and the rains are so frequent as to clothe the country in perpetual green. The climate, as to temperature, is about three degrees cooler than on the other side of the island; the range of the thermometer from January to May, 1841, was from 56° to 82° Far.; sometimes it has been known to fall as low as 52°, and rise as high as 87°.

On the eastern side of the entrance, is a conspicuous dark, bluff head, with two sandy beaches a short distance to the eastward; this bluff is the termination of a large green ridge, which is high inland, and gradually slopes to the sea, ending in a bluff point about 50 feet high. This bluff head should be given a wide berth, as a reef extends from it for about 3 cables.

A short distance to the southward of this bluff, is the mouth of a small river, in front of which is a bar which may be crossed by boats at half flood, and inside the bar carries a depth of from one to three-quarters of a fathom, and is navigable for boats drawing 3 feet, for several miles.

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* *See* plan on sheet, No. 1377.

About 4 cables from the mouth of the river, on the northern bank is a large farm, called Charlton farm, owned by the consul, who keeps a large number of cattle of good breed.

From the mouth of the river the bay sweeps round to the westward in a curve along a sand beach, for 2¼ miles to Black head, the western point of the bay, which is a spur of the high range of mountains running along the north-west coast.

Na Pali point, just west of the entrance to the bay, is the termination of some high land which slopes suddenly to the sea; some parts of the slope are jagged, forming several needle peaks; and on the extremity of the point there is a small hill, which appears detached when first seen on approaching the bay from the eastward; a reef extends about three-quarters of a mile from Na Pali point.

Supplies are plentiful: beef, vegetables, and fruit may be obtained in abundance. Water may be procured by sending boats into the river, which is easy of access in fine weather, and a short distance from the mouth the water is perfectly fresh.

Landing is generally effected inside the mouth of the river.

Anchorage.—A remarkable conical hill bearing S.S.E will lead to the anchorage in Hanalei bay. The depth of 20 fathoms is 1½ miles from the shore, and at the entrance to the bay depths of 7 to 9 fathoms will be obtained. The anchorage ground in the bay, in fine weather, is spacious, but there is only room for about three vessels in bad weather under the lee of the reef near the eastern point of the bay. A good berth will be found in 7 fathoms with the eastern extreme of the bay N. by E. ¾ E.; Black head W. ¼ N.; Charlton farm N.E. by E. ½ E.

Coast.—From Hanalei bay the coast trends 4 miles to the westward to Haena point, from thence in a general direction S.W. ½ W. 9 miles, and then S.S.W. 8½ miles to point Mana, the western extremity of the island.

The north-west coast of Kauai, forming the district of Na Pali, has a very rugged and romantic appearance, rising suddenly to lofty abrupt cliffs that jut out into a variety of steep, rocky points, destitute of both soil and verdure, but terminating nearly in uniform even summits, on which, as well as in the valleys or chasms that are formed between them, are small patches of green. Here and there a stream, running from the lofty mountains behind, finds its way to the ocean.

Point Mana, the west point of Kauai, is a long, low, sand-spit commencing at the foot of a high range of mountains. A reef extends off the point for about half a mile, besides which there are some outlying rocks.

Coast.—From point Mana the coast trends S.E. by S. for 4 miles to Konole point, and from thence E. ½ S. 5 miles to Waimea, and is fronted by a coral reef extending some distance from the shore. In 1876 H.M.S. *Myrmidon* obtained soundings in 6 fathoms off Konole point whilst running along the coast at a distance of half a mile from the breakers; on hauling out from the shore, the soundings gradually increased. This coast is open and exposed, and a heavy surf rolls in on the beach.

Between point Mana and Waimea the coast consists of a sandy plain, from a quarter to one mile wide, and 150 feet above the sea, whence it rises gradually to the mountains. It has a sunburnt appearance, and is destitute of trees, except on the low grounds where the cocoa-nut tree thrives and bears abundance of fruit. The sea along this shore abounds in fish.

Waimea bay, on the S.W. side of Kauai, affords the best anchorage round the island, except in the months of January and February, when the trade winds are interrupted, and S.W. winds sometimes blow strong directly on shore.

The village of Waimea derives its name from a river, which after a course of about 15 miles falls into the sea at this place. At one time it was a populous native town, but is now only a small village of little importance. Boats may ascend the river for about three quarters of a mile, and this is the only water that is not brackish.

Waimea may be recognised from seaward by Kona peak, which is of a reddish appearance and lying to the south-east of the village; and a conspicuous church in the village, standing on high ground, a short distance from the beach, and looking very like a sail in the distance.

On making Waimea from the eastward, the first low point with cocoa-nut trees on it is about two miles west of the river.

About a mile west of Waimea is the spot where Cook's boat first landed on the discovery of the Sandwich islands. As far as Cook sounded he found that the bank has a fine gray sandy bottom, free from rocks, except a little to the eastward of the village, where a shoal projects, on which are rocks and breakers, but not far from the shore.

This anchorage would be entirely sheltered from the trade wind if the height of the land did not alter its direction, and make it follow along the coast; so that it blows from N.E. on one side of the island and S.E. or E.S.E. on the other, falling obliquely on the shore, and often raising a nasty surf which renders landing at times very unpleasant, and sometimes impracticable.

Waimea bay should be approached with caution, as reefs extend to southward and W.S.W. from the centre of the bay; with the church bearing North, the soundings when obtained will decrease gradually, and with the church bearing N. $\frac{3}{4}$ E., a good berth will be found in 10 to 15 fathoms.

Coast.—From Waimea the coast trends for 5½ miles, S.E. by E., to Hanapepe, where there is a valley apparently formed by volcanic action, which is about half a mile wide at the entrance, and decreases in width as it approaches the mountains, and at its head is a beautiful waterfall, though the volume of water is not great.

On the west side of the entrance to the valley is Kona peak; and in front of it a coral reef commences and stretches some distance to seaward and then along the coast to the westward.

Captain King says that in running down to the anchorage off Waimea from the south point of the island he saw the appearance of shoal water in several places at a considerable distance from the land; and when about 2 miles eastward of the anchorage and 2 or 3 miles from shore, he got into 4½ fathoms water, although the soundings had been usually 7 or 8 fathoms.

From Hanapepe the coast trends East for 7 miles to Kaloa bay; the shore is steep-to and apparently free from off-lying dangers.

The whole distance between Waimea and Kaloa consists of a series of sunburnt hills and barren plains, sloping gradually to the shore from the mountains, and here and there intersected by ravines. There is no cultivation, and the soil only produces a kind of coarse grass quite unfit for pasture.

Kaloa bay, about a mile west of the south point of Kauai, is a slight indentation of the coast, where there is a considerable village of the same name, off which anchorage may be obtained, but in a very exposed position.

The country round Kaloa is much broken by hills and extinct craters; but the soil is good, though dry and very stony, and is capable of cultivation in many places. There is a sugar plantation here, and several large cattle ranches in the vicinity. Near the beach are two extinct craters.

The village may be recognised by many high buildings and two churches, and extends from the beach to a distance of two miles up the slope of the hill; also by a low point with a sandy patch on its western side, situated between the village and Makanuena, the south point. From this low point a rocky ledge extends out a short distance, and somewhat protects the anchorage.

There is a good landing-place at Kaloa in a small cove protected by a reef extending about a cable from the shore; an artificial creek has been made at the head of this cove, with sufficient space for one boat to enter.

Supplies of beef, vegetables, and fruit may be obtained in abundance.

Anchorage.—A red buoy for the local mail steamer is moored in 10 fathoms off the village, and less water will not be obtained until near the buoy, when a berth will be found in about 11 fathoms, sand and shells, with the western church bearing N. ¾ E.; the low point E. ¼ N.; dome-shaped mountain N.E.

It may be observed that from a position about a mile south of Makanuena, the most western point in view will be observed to have a black lava wall crossing it from east to west, and that the anchorage off Kaloa is about half a mile west of this point. This part of the coast appears to be fringed by a rocky ledge, but may be safely passed at a mile distant.

NIIHAU lies 17 miles W.S.W. of Kauai, from which it is separated by the Kumukahi channel, and is about 16 miles in length N.E. by N. and S.W. by S. and 6 miles broad.

This island is mostly low land except on the eastern side, where it rises directly from the sea to a height of 1,500 feet, and is rocky and unfit for cultivation. On the western side is a level plain from 2 to 4 miles in width, where the natives cultivate yams, fruits, sweet-potatoes, &c. The soil being dry, the yams grow to a great size and are of very good quality. The natives are few in number and very poor, and live almost entirely on the western side of the island. Of late years Niihau has been used as a sheep-walk, and in 1875 there was said to be about 70,000 sheep on the island.

The eastern side of Niihau is rocky and wholly destitute of shelter or anchorage; but on the western side there are several open roadsteads where anchorage may be obtained, though very exposed.

Coast.—Cape Kawaihoa, the south-east point of the island, terminates in a round hill. From here the coast trends in a bight for 8 miles N.E. by N. to Pueo point, near the middle of the east side, over which rises the highest point of the island. From Pueo point the coast continues to the northward for 6 miles to Oku point, the north-east extremity.

Lenua or Egg island, off the north point of Niihau, is a small, rugged, barren rock, apparently destitute of soil, and without any sign of habitation. It is separated from Niihau by a channel about a mile wide, in which the depth appeared irregular and therefore not recommended to be used.

Coast.—From the north point of Niihau the west coast runs in a general direction, S.W., for 12 miles to Kona point, which is a long low sandy point, having a rock 10 feet above water near it, and a reef which extends a short distance outside the rock. Off the point, breakers extend for nearly 1½ miles.

Yam bay is but an open roadstead about 1½ miles south of Kona point, where anchorage may be obtained in fine weather or with easterly winds. The soundings are regular, with a sandy bottom.

There is but one place in the bay where boats can effect landing with safety when the sea sets in, which is a common occurrence; this is on the northern side, behind a small reef of rocks that lies a little way off the beach, and even here it is necessary to guard against sunken rocks.

Vancouver anchored here in 18 fathoms, with Kona point bearing N.N.W. ¼ W. distant 1½ miles.

Cook's anchorage, on the south-west side of Niihau, is about 4 miles south of Kona point, and is exposed to the heavy north-westerly swell which frequently sets in, and breaks some distance from the shore; the bottom is composed of large rocks, with patches of sand in some places. Near the beach are a few huts, a church, and a derrick for loading and unloading boats.

Landing.—The landing-place is protected by some rocks forming a breakwater in the north-east part of the bay, and is situated just inside a lava patch, which from seaward appears like a point; landing can be effected easily in moderate weather, but with a heavy swell it is impracticable.

Supplies.—Whalers call here occasionally for fresh meat, but, the sheep being bred for wool only, very little meat can be procured, and only a limited quantity of vegetables or fruit is to be obtained.

Fresh water can only be procured during the rainy season, when the watercourses are full; at other times of the year there is no water but what the natives have collected in wells in the rock for their own use, and these are chiefly near the south end of the island.

Directions.—Vessels bound to Cook's anchorage from the north-eastward are recommended to pass north of Lenua island, and keep along the western shore of Niihau, as the trade wind blows more from the northward on this side of the island.

Lenua island may be rounded within half a mile, and the western shore of Niihau, which appears tolerably bold, may be passed at a distance of about 2 miles. The reef which extends off Kona point should not be approached nearer than three-quarters of a mile, when probably soundings will be obtained in 13 to 15 fathoms, deepening again to no bottom at 20 fathoms. When the huts at the landing-place at Cook's anchorage bear E. by N., they may be steered for, the soundings decreasing gradually to 12 and 9 fathoms.*

Anchorage.—In 1875, H.M.S. *Peterel* anchored in 9 fathoms, sand and rock, with Kaula island bearing S.W.; extreme of reef off Kona point N. ¾ E.; church N.E. by E. ¼ E.

Caution.—As the rollers set in with but little warning at Cook's anchorage, sailing vessels should proceed to sea on the first indications of them. On these occasions, the fishermen who go out for only a few hours are sometimes unable to land on their return, and have to go round to the other side of the island. These rollers generally last from three to four days.

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* Navigating Lieutenant N. Child, H.M.S. *Peterel*, 1875.

Coast.—From point Pahau, the south-west point of Niihau, the coast, which is much indented, trends E. by S. for 3½ miles to cape Kawaihoa.

In 1792, Vancouver anchored off this coast in 14 fathoms, bottom soft and sandy, about three-quarters of a mile from the shore; and with the wind well from the northward this is not a bad anchorage, as the swell does not set in so much as it does on the western side of Niihau.

KAULA OR TAHURA, lying 17 miles S.W. ½ W. from Niihau, is a small elevated barren rock, destitute of vegetation and uninhabited. It is visited by the natives to collect the eggs of the sea-birds which abound here. Landing can only be effected in the calmest weather, as the surf breaks heavily on the shore at all times.

BIRD ISLAND, in lat. 23° 3′ N., long. 161° 45′ W., was discovered on 13th April 1789 by Captain Douglas of the *Iphigenia*, and is situated 106 miles N.W. by W. ½ W. of Niihau.

It is a barren island 880 feet high, three-quarters of a mile long and one-third of a mile broad. The north side is a precipice, but on the south side there is a small bay, with a boulder beach about 200 feet in extent, where landing has been effected in the summer. The island is bold all round, and the resort of numerous sea-birds, which led to the belief that guano might exist; but from the formation of the rock and the large amount of heavy rain that falls in the vicinity, it is not possible for any quantity to accumulate.

Anchorage has been reported off the south side in from 7 to 17 fathoms, at from one quarter to 2 miles from the island.

ISLANDS, ROCKS, AND SHOALS.

The following islands, rocks, and shoals extend in a long line W. by N. of the Sandwich islands for a distance of 1,350 miles and more. They have seldom been visited, and therefore there may be many dangers yet undiscovered.*

JOHNSTON ISLAND was discovered in 1807 by H.M.S. *Cornwallis*, and examined in 1859 by Lieutenant J. M. Brooke of the U.S. schooner *Fenimore Cooper*. He landed and obtained good observations, which place a flagstaff on the western islet in lat. 16° 44′ 48″ N., long. 169° 30′ W. It is described as being a lagoon island, the reef being of a quadrilateral form 3½ miles in a N. by E. and S. by W. direction and 3¼ miles W.N.W. and E.S.E. On the reef are situated two islets, the larger being half a mile long E.N.E. and W.S.W., the smaller, a mere sand-bank, about a quarter of a mile in diameter. Breakers extend to the northward nearly 1½ miles, and a bank surrounds the reef, extending in a south-easterly direction 5 or 6 miles, with 10 to 20 fathoms.

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* *See* Admiralty charts:—Pacific Ocean, General No. 2,683; Pacific Ocean, N.E. sheet, No. 782; Pacific Ocean, N.W. sheet, No. 781.

There is anchorage about three quarters of a mile S.S.E. from the flag-staff on the large islet. The sea in the vicinity abounds with fish of a superior quality, and birds are extremely numerous.

SCHJETMAN REEF.—Captain Schjetman of the Norwegian ship *Anna* reported that on October 19th, 1868, he passed a coral reef at a distance of half a mile in lat. 16° 8′ N., long. 178° 58′ W., which appeared about 1½ miles long north and south, and about half a mile wide.

In 1880 it was not seen in this position by the U.S.S. *Alert.*

KRUSENSTERN ROCK, discovered by Captain Lisiansky and placed in lat. 22° 15′ N., long. 175° 37′ W., is stated to have a bank around it, stretching north and south about 2 miles, on which the sea broke in one place. The above position is considered to be doubtful.

NECKER ISLAND, in lat. 23° 36′ N., long. 164° 39′ W., was discovered by La Perouse in 1786. It is a small rocky island about 7 cables long W. by N. and E. by S., and 2 cables broad, with a peak near each end, the western 280, and the eastern 250 feet in height. There are no trees on the island, but some grass grows on the summit, and the rock being covered with a deposit of guano gives it a white appearance.

From a distance of less than a mile, the sides of the island appear as perpendicular as walls, against which the sea breaks violently and prevents the possibility of landing, except near the S.E. point, where there is a watercourse, and a small ledge of rocks extending about 2 cables to seaward, affording landing in moderate weather. On the north side there is a small islet, about 100 feet from the main island, and connected to it by a reef; there is also a small detached rock close to the east end.

Necker island is surrounded by a bank or shoal which extends to the southward for a distance of 24 miles, and having upon it depths varying from 14 fathoms and upwards. Captain Brooks, in the *Gambia,* crossed it in lat. 23° 12′ N., and found the bank about 15 miles wide; the western edge is very abrupt, the soundings varying from deep sea to 14 fathoms, sloping gradually to 35 fathoms at the eastern edge; the discoloration of the water may be seen at a distance of 3 miles from the masthead. Hitherto no dangers have been discovered on the bank, beyond the rocks in the vicinity of the island, but, owing to its great extent, there may be heads or pinnacles not yet known.

At about 2 miles S.W. of the island there are depths of 15 to 18 fathoms, coral and broken shells, gradually decreasing to the westward, where at 10 miles from the island no bottom was obtained with 135 fathoms of line.

On passing over the bank, great quantities of fish of excellent quality may be caught with lines.

According to Captain Brooks, the best anchorage is on the north-west side of the island.

FRENCH FRIGATE SHOAL, lying 90 miles west of Necker island, was discovered by La Perouse in 1786, the day after leaving Necker island. This dangerous and extensive shoal is a crescent-shaped atoll, on which are 16 islets or sandbanks and one principal island; the points of the crescent are N.W. and S.S.E. from the principal island, and about 16 miles apart.

The island, in lat. 23° 47′ N., long. 166° 15′ W., is 180 feet long, 45 feet wide, and 125 feet high, rising to a ridge in the centre, and so steep and rugged as to be almost inaccessible; it may be seen from a distance of about 8 miles and resembles a ship under sail, and from it the largest sandbank bears E.N.E. 4 miles.

This island was reported to have extensive deposits of guano, which led to its being visited by Captain Brooks of the *Gambia* in 1859, but, finding none there, he left a party of twenty men on the island while he proceeded to explore the islands to the westward; during the summer months these men subsisted very comfortably on fish, turtle, fowls, and eggs, and water was obtained by digging a well on the largest sandbank about 600 yards from the beach, and 8 to 10 feet deep; the water was somewhat brackish, but found to answer the purpose very well. These men collected a considerable quantity of seal skins, seal oil, sharks' fins, &c.

This shoal is generally avoided, as several wrecks have occurred on the reef.

Vessels of any size can approach the island within a cable's length, and may anchor anywhere inside the reef in from 3 to 14 fathoms. The bottom is composed of coral patches and sand.

Entering from the south side, the central island bearing N. by W. ½ W. will lead clear of all dangers, and when up to the island, on the western side, a N.W. ½ W. course leads clear past the N.W. horn: proceeding across the shoal from south to north, the soundings vary between 12 and 17 fathoms, and the bottom from broken shells, sand and coral, to rock, sand and coral.

There is no danger outside the line of breakers; and the current was observed to be running to the S.W. at the rate of about 2 knots per hour.

BROOKS SHOAL.—In 1859, Captain Brooks, after running 30 miles W.N.W. from French Frigate shoal, crossed a bank with 14 fathoms over it, and saw the bottom distinctly. This places the shoal in lat. 23° 52′ N., long. 166° 57′ W.

GARDNER ISLAND, in lat. 25° 1′ N., long. 167° 59′ W., was discovered by Captain Allen of the whaler *Maro* in 1820. It is an inaccessible rock about 180 feet high and 200 yards in diameter, with a smaller rock close to the S.W. extremity, from which a reef extends about half a mile.

A bank, with from 17 to 20 fathoms water, surrounds the rock, extending westward about 5 miles, and S.W. more than 8 miles.

MARO REEF, the centre of which is in lat. 25° 27′ N., long. 170° 30′ W., was discovered by Captain Allen of the whaler *Maro* in 1820, and is a dangerous shoal about 30 miles in circumference, consisting of small detached patches of coral and sand, which are covered with breakers, the heaviest being near the N.W. end.

At times the breakers are very light, being scarcely distinguishable from sea caps, so that great caution is necessary when approaching it; in clear weather it may be seen from aloft from a distance of 5 miles.

The reef is nearly surrounded by a bank on which are soundings of from 10 to 30 fathoms, extending from 2 to 7 miles and deepening gradually from the reef.

The reef is open to the westward, where there is good anchorage.

DOWSETT REEF.—On 4th July 1872, the whaling brig *Kamehameha* struck on a reef about 13 miles south of the Maro reef, the centre of which the master places in lat. 25° 13′ N., long. 170° 38′ W.

It extends N.W. and S.E. about 8 miles, and is about 4 miles broad; in some parts the reef is awash and the sea breaks all over it.

LAYSAN ISLAND, in lat. 25° 45′ N., long. 171° 50′ W., is a small low island covered with shrubs, about 2 miles long and 1½ miles wide, 20 feet high, and enclosing a lagoon a mile or more across.

The island is surrounded by a reef which extends for about half a mile, outside of which is a bank 5 miles wide, with from 14 to 19 fathoms over it. Inside the reef is a boat passage nearly all round the island.

It is reported that no dangers exist beyond the line of breakers. Boats may effect landing in safety anywhere except on the south and south-east sides. Good anchorage may be obtained on the west side; the best, however, is about half a mile from the S.W. point in from 8 to 12 fathoms, coral bottom.

In 1859, there were five palm trees on the island, about 15 feet in height. Water of tolerable quality may be obtained by digging to a depth of two feet. The island abounds in sea-fowl, and eggs of many kinds are abundant. Seal, turtle, and fish are numerous, and easily taken.

LISIANSKY ISLAND, lying 113 miles W. ¼ S. of Laysan island, was discovered by Captain Lisiansky of the Russian ship *Neva* in 1805. It is a small low coral island overgrown with grass, about 6 miles in circumference and 40 feet in height; the centre is in lat. 26° 0′ N., long. 173° 57′ W.

The island is encircled by a reef which, on the west side, forms a lagoon 2½ miles wide, in which there is a good anchorage in from 4 to 12 fathoms; the entrance to the lagoon is marked by two heavy breakers, bearing north and south from one another, three-quarters of a mile apart and about 2 miles from the island; between these two breakers are several small rocks nearly awash, which may be avoided by steering from aloft; inside the lagoon are a number of scattered rocks, but as the water is smooth they are easily avoided.

The approach should be made from the north, as a low and dangerous reef extends to the southward for nearly 7 miles, and in moderate weather the breakers on it can scarcely be distinguished from sea-caps. A reef extends for 1½ miles to the E.S.E., on which the *Neva* struck.

Near the south end of the island is the basin of what was once a lagoon, but is now overrun with weeds, &c. A plentiful supply of water may be obtained by digging a few feet. Birds, fish, seal and turtle abound.

PEARL AND HERMES REEF, lying 145 miles N.W. ¾ W. of Lisiansky island, is an extensive coral reef about 42 miles in circumference, 16 miles long east and west, and 9 miles wide, on which are scattered twelve small low islands and islets, forming a crescent which is open to the W.N.W.

This reef, the centre of which is in lat. 27° 52′ N., long. 175° 53′ W., was discovered in 1822 by two whalers, the *Pearl* and the *Hermes*, which were wrecked near the eastern end on the same night, within 10 miles of each other.

Inside the lagoon, the only entrance to which is on the N.W. side, there is anchorage in from 3 to 15 fathoms, but the islands cannot be approached within 2 miles.

The largest island is 2½ miles in length, covered with grass and low trees, and lies E. by S. ½ S. from the entrance.

There is anchorage outside the reef in from 8 to 12 fathoms, but the best is on the N.W. side near the entrance. The reef is steep-to on the east side, the 100 fathom line being within 1½ cables of the reef; but on the west side the water runs off shoal for a considerable distance to 35 fathoms, thence it deepens very suddenly. There are no known dangers outside the breakers.

Seal and turtle are abundant, and quantities of excellent fish may be obtained.

GAMBIA BANK was discovered by Captain Brooks of the *Gambia* in 1859, who stated it to lie about 30 miles W. by N. of Pearl and Hermes reef, with 14 fathoms water over it, and bottom distinctly seen: this places it in lat. 27° 50′ N., long. 176° 30′ W.

MIDWAY ISLANDS, lying 77 miles W. ½ N. of Pearl and Hermes reef, were discovered by Capt. Brooks of the *Gambia* in 1859, who took possession of them for the United States, and they have since been utilized by the Pacific Mail Company, who intended to form a depôt here for their trans-Pacific steamers, instead of using Honolulu.*

This atoll, on which are two small islands, was examined and surveyed by Captain W. Reynolds, U.S.S. *Lackawanna*, in 1867, from whom the following information has been derived.

The reef encircling Midway islands is pear-shaped, with its stem part to the eastward; it is 18 miles in circumference and without a break, except on the western side. At the north-west point is a small patch of breakers, a few detached rocks, and then commences a compact coral wall, about 5 feet high, and from 6 to 20 feet wide, which continues for 4¼ miles to the southward and eastward, when it loses its uniformity of surface and presents a line of detached rocks very little more than awash, for 2½ miles to the southward; there, off the centre of the eastern island, the rocks dip under water, but re-appear 2 miles to the westward, from whence they again show as a continuous wall for about 4½ miles to the westward and northward, ending there and forming the south side of the entrance to Welles harbour.

This entrance is about three quarters of a mile broad, and from its northern side to the north-west rocks there is a bed of coral with from one to 16 fathoms, showing above water in one place, with occasional breakers.

The northern, eastern, and southern portions of the reef are steep-to, to the rocks. The bottom is visible in two places only, near the north-east and south-east points, where the soundings are shown on the chart.

Eastern island is at the eastern extremity of the reef, 1¼ miles in length and half a mile wide, from 6 to 15 feet high, and covered with coarse grass and small shrubs; the beach of coral sand is of dazzling whiteness.

Sand island, 1¼ miles west of the eastern island, is 1½ miles long, three quarters of a mile wide, and 57 feet high, on the summit of which a flagstaff has been erected. There is very little vegetation on this island, and the glare from the sand is very trying to the eyes. The agent for the

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* *See* plan on sheet No. 2,169.

Pacific Mail Company lives on this island, as being more conveniently near the harbour.

The observation spot near the south-west end of the island is in lat. 28° 12′ 22″ N., long. 177° 22′ 20″ W.

Sandspit.—Near the north-west point is a sandspit which varies in size considerably from time to time, sometimes almost disappearing.

Welles harbour is formed by a gap in the coral reef, and is roomy and safe; with the entrance open to the westward, and 1¼ cables wide where most contracted.*

The bar, which is well within the entrance, and on which there is no swell during the trade winds, is narrow, and has an uneven bottom of coral rock and small sand-holes; its depth varies from 16 to 21 feet, but changes so often and suddenly as to make it unsafe to count on crossing without getting a cast of 18 feet. Inside the bar, the depth for anchoring is from 5 to 7 fathoms, white sand. The harbour is therefore only fit for vessels drawing less than 18 feet; vessels of deeper draught must lie in Seward road, picking out a sandy bottom to anchor on.

The lagoon near the centre of the reef is 2 miles long and 1½ miles wide, with many coral heads in it, with from one to 2 fathoms water over them.

Welles harbour is separated from the lagoon by shoal water, a mile in breadth, and as far as could be ascertained there is no passage for ships. It might be possible for a light draught vessel to get into the lagoon by passing to the northward of the middle ground, and threading her way in among the rocks; but no regular ship channel exists.

Tides.—It is high water, full and change, at 3 hrs. 28 m. Springs rise 1½ feet, neaps one foot. The tides are regular, and at the outer anchorage the flood sets to the northward and the ebb to the southward, from one to 2 knots. In Welles harbour the current always runs out to the westward, but not with much strength.

Wind and weather.—In July, 1867 the trade wind blew strong, with clear weather; during August of the same year the weather was generally fine and clear, with light winds from N.N.E. to S.S.E.; rain fell on 6 days, usually at night and but seldom accompanied by wind; the thermometer ranged from 72° to 89°, and the barometer from 29·92 to 30·25.

Anchorage.—On the west side, sheltered anchorage during the trade winds may be obtained in from 10 to 13 fathoms, but on a very foul bottom. The best outside anchorage is in Seward road in 10 to 13 fathoms at the entrance to Welles harbour.

The coral ridge which extends from the north-west end of the reef to the southern wall gives very irregular soundings, having deep fissures between the rocks, and again spaces of sandy bottom; the *Lackawanna* lost both her anchors here.

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* *See* plan on sheet No. 2169.

Directions.—Steam vessels, in approaching Midway islands from the eastward, should make the eastern island, and pass round the southern side to the anchorage in Seward road. If coming from the westward, Sand island should be made.

Sailing vessels from the eastward, during the trade season, should keep to the northward of the reef, and pass round the north-west rocks, so as to retain a fair wind to the anchorage.

Square-rigged vessels must warp into the harbour with easterly winds.

Supplies.—Fish of many varieties are plentiful, and by hauling the seine enough may be caught to supply the ship's company. Seal and turtle abound. A few curlew and plover are the only land-birds on the islands.

Water may be procured on both islands by digging from 4 to 7 feet, and, though at first full of impurities, yet, by filtration and allowing it to stand, it becomes drinkable.

CURÉ or OCEAN ISLAND, lying 56 miles West of Midway islands, which it closely resembles both in formation and appearance, consists of an island 1½ miles long, and three quarters of a mile wide, and two small islets or sandbanks, surrounded by a reef, somewhat oval in shape, which encloses a lagoon, the entrance of which is to the south-westward, about a mile in width and very shallow.

The reef is 14¾ miles in circumference and no outlying dangers have been observed.

Green island, in the S.E. corner of the lagoon, is covered with small shrubs, about 20 feet high, and similar to the eastern of the Midway islands. To the westward of it are two small islets or sandbanks, the western of which is about 10 feet high, in lat. 28° 25′ N., long. 178° 27′ W.

A bank extends round the reef to about a mile, with 20 to 30 fathoms water over it. The best anchorage is on the west side, near the N.W. point of breakers, in from 8 to 12 fathoms, rocky bottom. From the appearance of the islands they are sometimes visited by severe storms, the sand being thrown into numerous cones and pyramids.

PATROCINIO or BYER ISLAND was discovered by Morrell in 1825, who placed it in lat. 28° 32′ N., long. 177° 4′ E.

This island, about 4 miles in circumference, is of volcanic origin, of moderate height, and has some shrubs and smaller vegetation on it.

The only danger is on the S.E. side, where a coral reef stretches 2 miles to the southward. There is good anchorage on the W.S.W. side in 15 fathoms, sand and coral.

This island is the resort of sea-fowl, sea-elephants, and turtle, and fish abound in the vicinity. Fresh water may be obtained on the S.W. side of the island.

MORRELL ISLAND, so called from the name of its discoverer, by whom it is placed in lat. 29° 57′ N., long. 174° 31′ E., is said to be a small low island, nearly level with the water, and about 4 miles in circumference, with reefs extending from it for about 15 miles to the west, and about 30 miles in a S.S.E. direction. The position, and even the existence, of this island is doubtful.

MELLISH BANK, which is placed on the Admiralty charts in lat. 34° 0′ N., long. 178° 12′ E., has been reported to have a depth of 64 fathoms over it, but this position is doubtful, as reports of soundings having been obtained in this vicinity vary greatly in position.

GANGES ISLAND or REEF, placed on the Admiralty charts in lat. 30° 47′ N., long. 154° 15′ E., is one of the many dangers that have been reported at various times in this locality, but nothing positive is known as to their proper position, though the numerous reports point to the fact of the probable existence of some danger in this region, the establishment of which is important.

TABLE OF POSITIONS.

Place.	Particular Spot.	Latitude.	Longitude.
	SOCIETY ISLANDS.		
		° ′ ″	° ′ ″
Tahiti - - -	Venus point, Observation place.	17 29 14 S.	149 29 0 W.
Murea - - -	Cook bay, Nuupure point	17 28 42 „	149 49 15 „
Huaheine - -	Owharre harbour, King's house.	16 42 31 „	151 1 30 „
Raiatea - ..	Regent point - -	16 43 44 „	151 26 0 „
Easter island - -	Cook bay, Observation place.	27 10 0 „	109 26 0 „
	PAUMOTU ARCHIPELAGO.		
Pitcairn island -	Adamstown - -	25 3 30 „	130 8 30 „
Gambier islands -	Manga Reva, Flagstaff -	23 7 34 „	135 0 20 „
Hao island - -	Morai on east point of entrance.	18 3 38 „	140 59 15 „
			5 „
			2 30 „
			5 55 „
			2 0 „
			4 50 „
			4 30 „
			7 45 „
			2 0 „
			1 30 „
„ - -	[illegible] monument.		
Maui - - -	Kahului harbour, Hobron's flagstaff.	20 5	
Oahu - - -	Honolulu, King's Cottage	21 1	
Kauai - - -	Nawiliwili bay, Observation spot.	21 5	
Midway islands -	Sand island, S.W. point -	28 12	

This island is the resort of sea-fowl, sea-elephants, and turtle, and fish abound in the vicinity. Fresh water may be obtained on the S.W. side of the island.

MORRELL ISLAND, so called from the name of its discoverer, by whom it is placed in lat. 29° 57′ N., long. 174° 31′ E., is said to be a small low island, nearly level with the water, and about 4 miles in circumference, with reefs extending from it for about 15 miles to the west, and about 30 miles in a S.S.E. direction. The position, and even the existence, of this island is doubtful.

MELLISH BANK, which is placed on the Admiralty charts in lat. 34° 0′ N., long. 178° 12′ E., has been reported to have a depth of 64 fathoms over it, but this position is doubtful, as reports of soundings having been obtained in this vicinity vary greatly in position.

GANGES ISLAND or REEF, placed on the Admiralty charts in lat. 30° 47′ N., long. 154° 15′ E., is one of the many dangers that have been reported at various times in this locality, but nothing positive is known as to their proper position, though the numerous reports point to the fact of the probable existence of some danger in this region, the establi [redacted]

TABLE OF POSITIONS.

Place.	Particular Spot.	Latitude.			Longitude.		
		°	′	″	°	′	″
SOCIETY ISLANDS.							
Tahiti	Venus point, Observation place.	17	29	14 S.	149	29	0 W.
Murea	Cook bay, Nuupure point	17	28	42 ,,	149	49	15 ,,
Huaheine	Owharre harbour, King's house.	16	42	31 ,,	151	1	30 ,,
Raiatea	Regent point	16	43	44 ,,	151	26	0 ,,
Easter island	Cook bay, Observation place.	27	10	0 ,,	109	26	0 ,,
PAUMOTU ARCHIPELAGO.							
Pitcairn island	Adamstown	25	3	30 ,,	130	8	30 ,,
Gambier islands	Manga Reva, Flagstaff	23	7	34 ,,	135	0	20 ,,
Hao island	Morai on east point of entrance.	18	3	38 ,,	140	59	15 ,,
MARQUESAS ISLANDS.							
Fatu-hiva	Hana-vave bay, Observation place.	10	27	6 ,,	138	39	5 ,,
Hiva-oa	Taa-hu-ku, Mission station	9	47	32 ,,	139	2	30 ,,
Ua-pu	Vaieo bay, Observation point.	9	23	5 ,,	140	5	55 ,,
Ua-huka	Hannay bay, Motu Haané	8	56	0 ,,	139	32	0 ,,
Nuku-hiva	Anna Maria bay, Flagstaff	8	55	15 ,,	140	4	50 ,,
Caroline island	South island, Flagstaff	10	0	1 S.	150	14	50 ,,
Christmas island	Cook island, Observation spot.	1	57	17 N.	157	27	45 ,,
Fanning island	English harbour, Flagstaff	3	51	26 ,,	159	22	0 ,,
Palmyra island	Observation spot near S.W. islet.	5	49	4 ,,	162	11	30 ,,
SANDWICH ISLANDS.							
Hawaii	Hilo bay, Cocoa-nut islet	19	43	51 ,,	155	5	15 ,,
,,	Kealakekua bay, Cook's monument.	19	29	0 ,,	156	2	40 ,,
Maui	Kahului harbour, Hobron's flagstaff.	20	54	15 ,,	156	27	50 ,,
Oahu	Honolulu, King's Cottage	21	18	0 ,,	157	15	53 ,,
Kauai	Nawiliwili bay, Observation spot.	21	57	50 ,,	159	27	20 ,,
Midway islands	**Sand island, S.W. point**	**28**	**12**	**22 N.**	**177**	**22**	**20 W.**

TIDE TABLES.

Place.	High water at full and change.	Rise.		Remarks.
		Springs.	Neaps.	
	h. m.	ft.	ft.	
Rapa island	12 15	2½		
SOCIETY ISLANDS.				
Papiete, Tahiti	noon	1¼		
Easter island	0 39	6 ?		
Sala-y-Gomez	4 0	4 ?		
PAUMOTU ARCHIPELAGO.				
Manga Reva	1 50	3		
Hao island	2 40	3		
Makemo or Philip island	3 0			
MARQUESAS ISLANDS.				
Fatu-hiva	3 50	3¼		
Tau-ata	2 30	4		
Hiva-oa	3 50	3		
Nuku-hiva	3 50	4¼		
Caroline island	4 0	1½	½	
Penrhyn island	6 0?	1½		
Christmas island	4 23	3		
Fanning island	6 0	2½		
Palmyra island	5 23	2	1½	
SANDWICH ISLANDS.				
Hawaii, Hilo bay	1 0	3		
„ Kealakekua bay	3 49	2 ?		
Maui, Kahului harbour	11 40	3–4		
„ Makena	1 0?	5?		
Oahu, Honolulu	4 25	2½–3		
Kauai, Nawiliwili	3 45	2½–3		
Midway islands	3 28	1½	1	

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